December 1, 1947

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 53

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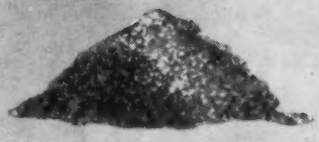
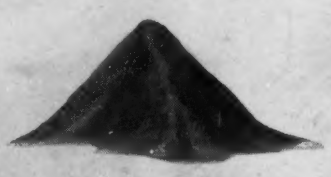
DETROIT

SOUTHERN FERRO ALLOYS FERRO SILICON CAN BE SUPPLIED IN:

LUMP

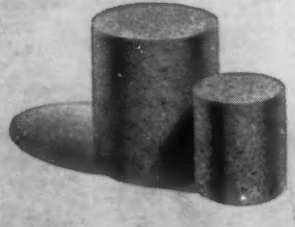


CRUSHED



POWDER

48 to 200 mesh
Lump, Crushed and Powder available in 50%, 65%, and 75% grades.



BRIQUETTES

with EXACTLY 1 lb. and 2 lbs. contained Silicon.

FERRO SILICON

Tailor Made

to your specifications

Your melt may require Ferro Silicon with low aluminum, low titanium, low copper . . . or other special analysis. It may require that the total of all impurities other than silicon and iron, be less than ½ of 1%.

During 30 years of continuous production of Ferro Silicon to exact specifications, we have developed and supplied many special Ferro Silicons which were considered "impossible." Close personal attention to special requirements for particular melting needs has enabled us to comply precisely with customers' specifications. We believe we have justly earned our trade reputation as being the suppliers of Ferro Silicon Specialties.

Your inquiries on specialties of this nature . . . and on our regular lines of Ferro Silicon . . . are solicited.

Immediate Shipment (on Standard Grades) from Chattanooga, Birmingham, Chicago

SOUTHERN FERRO ALLOYS COMPANY
CHATTANOOGA 2, TENNESSEE

Represented in Respective Territories by

T. H. BENNERS AND CO.
Birmingham, Alabama

MILLER AND COMPANY
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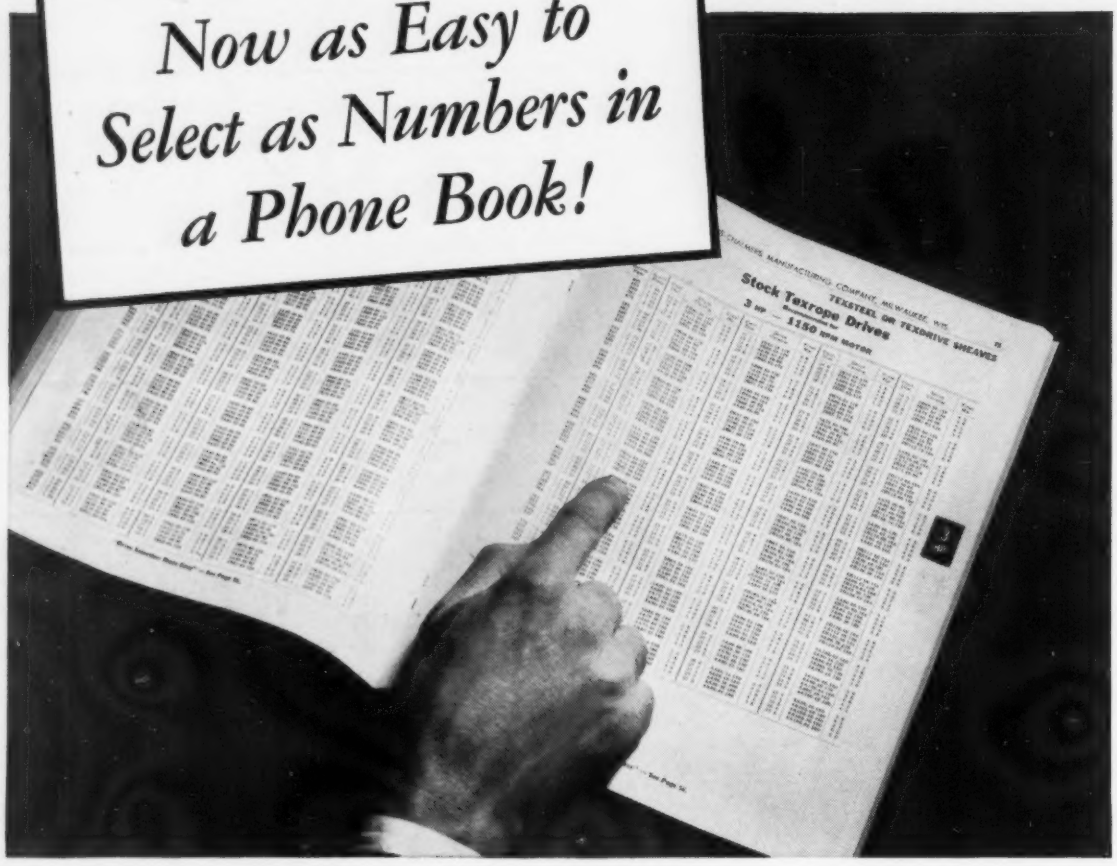
ECONOMICAL
Pre-Engineered
TEXROPE V-BELT DRIVES

Now as Easy to Select as Numbers in a Phone Book!



This New Manual is the most complete, most usable V-belt drive engineering handbook ever compiled.

It puts at your fingertips *all* the information you need to solve any V-belt drive problem — quickly, correctly. It contains:

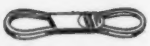
Pre-Engineered Stock Drives from 1 to 150 hp, that solve 90% of all applications. Edge-indexed for quick reference — turn to the page, read off the one BEST drive for your needs.

Engineering Tables . . . drive selections . . . sheave dimensions . . . general information . . . conveniently arranged for easy use in figuring any *special* drives not covered in Pre-Engineered drive tables.

Only Allis-Chalmers, originator of the multiple V-belt drive, can offer you such a book. It's the result of 23 years of industrial V-belt drive experience, and the greatest engineering talent in the business!

Copies have been mailed to many Texrope users. If you do not have a copy, write for Texbook No. 20P40. A 2336

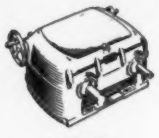
TEXROPE .. Greatest Name in V-Belt Drives



"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.

"Vari-Pitch" SHEAVES
Exact variations in speed, stationery or motion control.



SPEED CHANGERS
Speed variations up to 375% at the turn of a crank.

ENGINEERING
Finest V-Belt engineering talent in the world—at your call.

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

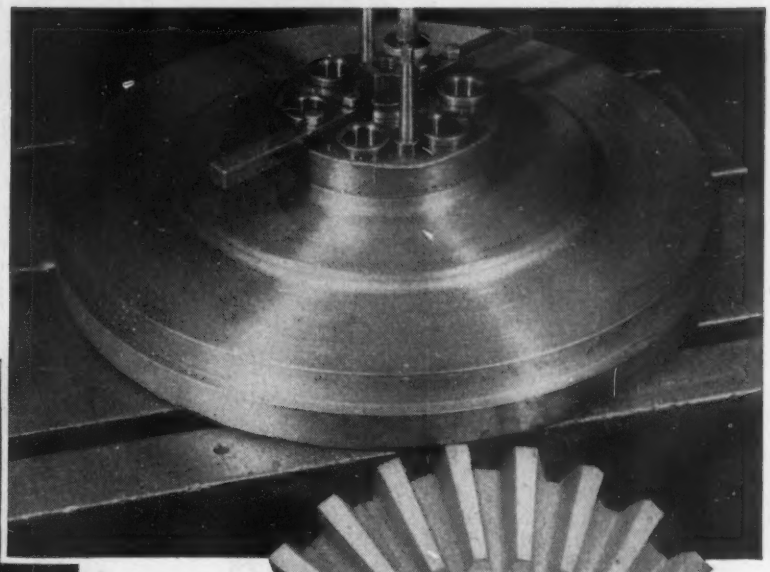
Texrope, Super-7, Texsteel, Texdrive, Magic-Grip and Vari-Pitch are Allis-Chalmers Trademarks

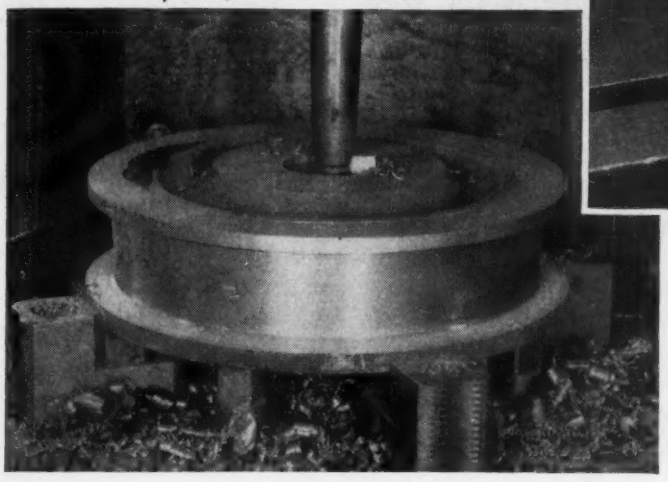
ALLIS-CHALMERS

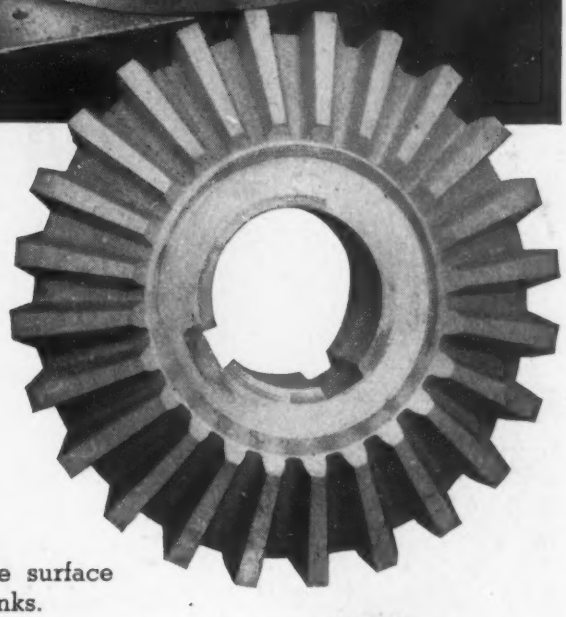
One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947
A CENTURY OF SERVICE to Industry THAT MADE America Great

"We tried 'em...We like 'em"







Shown here are some typical products made from Bethlehem's rolled-and-forged circular blanks. *Above*, crane-track wheel and flywheel; *right*, bevel gear and turbine rotor.

The man is talking about Bethlehem circular forgings. Could be he's you. In any event, he represents the many designers and production men who know the advantages of these sturdy money-saving products.

For makers of finished gears, crane-track wheels, turbine rotors, sheaves, flywheels, tire molds, and numerous other circular items, Bethlehem's forged-steel blanks are both practical and economical. They are not made by conventional forging and rolling, but by a process that combines these steps in one unique machine. It is a carefully-worked-out method that imparts homogeneity, excellent physical properties, and fine surface characteristics to the blanks.

Designers like Bethlehem circular forgings because their high quality often makes possible thinner sections . . . savings in weight. And, because the blanks are rough-machined before they leave our plant, they're welcomed by the production men. Bethlehem's rough-machining, of course, saves a plant operation for the customer.

We can supply these blanks in carbon or alloy steel, treated or untreated. Sizes range from approximately 10 to 44 in. OD. More details—and there are many of interest—will be cheerfully furnished at your request.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

the world is waiting...

. . . for your products.

To speed up your assembly lines, to accelerate your fast repetitive operations—use lightweight, powerful Ingersoll-Rand Air Tools... Drills... Grinders... Chipping Hammers... Impact Wrenches... Riveters ...Air Motors... Diggers... Air Hoists... Vibrators... Sanders... Pumps... Rammers... Screwdrivers, etc.

Phone our nearest branch office for a demonstration.

AIR TOOLS ROCK DRILLS
COMPRESSORS • TURBO BLOWERS
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OIL AND GAS ENGINES

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11 Broadway, New York 4, N. Y. 62-8

Where rubber lasted 14 times as long as steel

A typical example of B. F. Goodrich improvement in rubber

THAT rain of rocks formerly wore out half-inch steel plates every six months.

Gravel plants separate their stones by size, for different uses — and the big ones really punish anything they hit. To make it worse, the steel plates, onto which the stones used to slide, are hard to get at, and replacement was a nuisance as well as a high cost.

Someone had heard that B. F. Goodrich had a rubber called Armorite, specially compounded to stand this sort of beating. The plate that catches the rocks shown in the picture was covered with this BFG rubber seven years ago.

Since then 800,000 tons of gravel have been processed in this plant and there still is no sign of wear on this water-lubricated rubber. It has lasted 14 times as long as steel a half inch thick.

Developing special rubbers to meet special conditions like this is a regular occurrence at B. F. Goodrich. Don't think of rubber as a single material. B. F. Goodrich engineers have developed hundreds of rubbers to meet hundreds of special problems — to stand heat, acids, oils, sunlight, exceptional wear, abrasion, tearing and many other conditions. Don't decide that rubber cannot serve you or improve your product or process until you find out what B. F. Goodrich has developed. *The B.F.Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F.Goodrich

FIRST IN RUBBER

Behind the Scenes...

Reunion in Print

In our September 22 issue we ran a picture of Dr. James R. Boyd being sworn in as the new Chief of the Bureau of Mines. Over in England, one of our readers is D. R. Griffith, section chief accountant at the Panteg Works, Richard Thomas & Baldwins Ltd., Griffithstown, Pontypool. Mr. Griffiths of Griffithstown, like many another British steel man, is a careful reader of our pages, and he noted that picture. To him that brought back wartime memories, because he was associated with Dr. Boyd as one of his executive officers in a branch of SHAEF. So Mr. Griffiths sat himself down and penned a note to us and one to Dr. Boyd, which has been sent on its way to Washington, and we hope the new chief will be pleased to hear from one of his ex-associates, and will recognize as thousands of men of metalworking have recognized, the importance of STEEL as a news-medium of the metalworking industry.

Mathematics of Mail

In preparing this august column, one of our cardinal rules is to do things just about in the opposite direction from the editors, much to their chagrin. We constantly violate most of the rules of their style book, and on some occasions seem to have little reverence for the facts in the case, finding it more interesting that way. Facts, of course, are a fetish with upstairs boys, and you'll seldom find anything unprecise about the material they put in the west end of this book. And perhaps of all the assorted facts and laws of this world, those pertaining to mathematics have the least influence on us. So, it wasn't too surprising the other day to find in our mailbox a note from one of our academic readers, the good Dr. Cotter of Alabama, casting aspersions upon our mathematical prowess. Cotter says that if we knew anything about mathematics (which we don't) we'd know that our mailing list story of a couple of weeks back would have at least 15% correct names after 18 years, even if 10% of the list changed every year. Well, pehaps that's true—but in actual mailing list practice, which we do know something about, the percentage would be somewhat higher than that simply because a large part of the 10% which changed last year changed again this year and will probably change again next year—it's those revolving boys which give our circulation department so many headaches and also cause the sales departments of every business in these United States no end of trouble. We've checked with our department mathematician, and he says that Dr. Cotter is quite right, but even so, we will probably continue to print stuff here calculated to increase the incidence of migraine among mathematicians!

'Ere's Yer Club, Sir

Speaking of the British reminds us that if any of you are planning to go over there on business, there's a new club waiting to welcome you. It's known as the International Business Services, and it's housed, according to their publicity release, in a comfortable house in Arlington St., Piccadilly. There's no membership fee—and all overseas businessmen are welcome. No longer need you approach London in fear and trembling on account of maybe you might by chance get in the wrong place and be socially ostracized for life. And at virtually no cost to yourself you can wow the home folks by spinning tales about your club in Deah ol' Lunnon! Not only that, but the place supplies reading rooms, a trade information bureau which will set up appointments for you, translation services, secretaries, office space, conference rooms, etc., etc., which can all be had for a slight fee in case you might want to do a little business over there.

Perusing the Periclase

We will have to confess that we were completely stopped by the headline on the Basic Refractories advertisement in our November 17 issue. Using an old format with new words, it said, "It isn't the magnesia, it's the periclase." Well, we are fairly well acquainted with magnesia, both in the medicine cabinet form and also the form used in our industry, but periclase, well, that's something else again. According to our new edition of Webster's rock-pile companion, we learn that periclase is not to be found in the dictionary. So we are very happy that the creators of this advertising had the forethought to mention down in their copy that periclase is really magnesia, but it is the crystalline form of magnesia—the form in which refractory qualities really sit up and show their stuff.

Shrdlu

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STEEL

Vol. 121—No. 22 December 1, 1947

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Editorial Staff on Contents Page

For products that have to withstand hard wear outdoors or indoors, the high quality and instant eye appeal of stainless steel give a decided sales impetus.

The superiorities that have won leadership for Sharon Stainless are the result of precise control from ore to finished product. This gives a strip uniform in gauge and strength, that fabricates easily and has a permanent, brilliant lustre.

Wherever utility and permanent beauty are required, specify Sharon Stainless Steel Strip with confidence. Furnished in coils for long machine runs or in cut lengths, as desired.

SHARON STEEL CORPORATION

Sharon, Pennsylvania

PRODUCTS OF SHARON STEEL CORPORATION AND SUBSIDIARIES: THE NILES ROLLING MILL COMPANY, NILES, OHIO; DETROIT TUBE AND STEEL COMPANY, DETROIT, MICHIGAN; BRAINARD STEEL DIVISION, WARREN, OHIO; SHARONSTEEL PRODUCTS COMPANY, DETROIT, MICHIGAN, AND FARRELL, PENNSYLVANIA. Hot and Cold Rolled Stainless Strip Steel — Alloy Strip Steel — High Carbon Strip Steel — Galvanite Special Coated Products — Cooperage Hoop — Detroit Seamless Steel Tubing — Seamless Steel Tubing in Alloy and Carbon Grades for Mechanical, Pressure and Aircraft Applications — Electrical Steel Sheets — Hot Rolled Annealed and Deoxidized Sheets — Galvanized Sheets — Enameling Grade Steel — Welded Tubing — Galvanized and Fabricated Steel Strip — Steel Strapping, Tools and Accessories.

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For peak

THE NEW MONARCH

Speed, accuracy and economy of metal-turning have been our determining factors in developing the design of the new Monarch Series 60 Lathes, first announced at the Machine Tool Show. They're offered in two distinct series—toolmaker's lathes and engine lathes—both built in 14″, 16″, 18″ and 20″ sizes.

For modern metal-turning at its best—*for peak production at a profit*—check these "firsts" features, then ask us to give you complete details:

★ **CONVENIENCE OF OPERATION**—New, faster, fool-proof speed change, from simple, convenient automatic-locking head stock levers.

★ **SILENCE OF OPERATION**—Smooth-running helical gears give audible evidence of precision manufacture, for longer life and sustained accuracy.

★ **SIMPLER, SAFER LUBRICATION**—Filtered and metered force feed. Totally enclosed end gearing, spray-lubricated.

★ **HIGHER SPINDLE SPEEDS**—Greater horsepower for carbide tool use.

★ **RIGID, RUGGED CONSTRUCTION**—Greater weight. Hardened and ground steel parts throughout, including flame-hardened bed ways for both carriage and tailstock —and many other surfaces, at no extra cost.

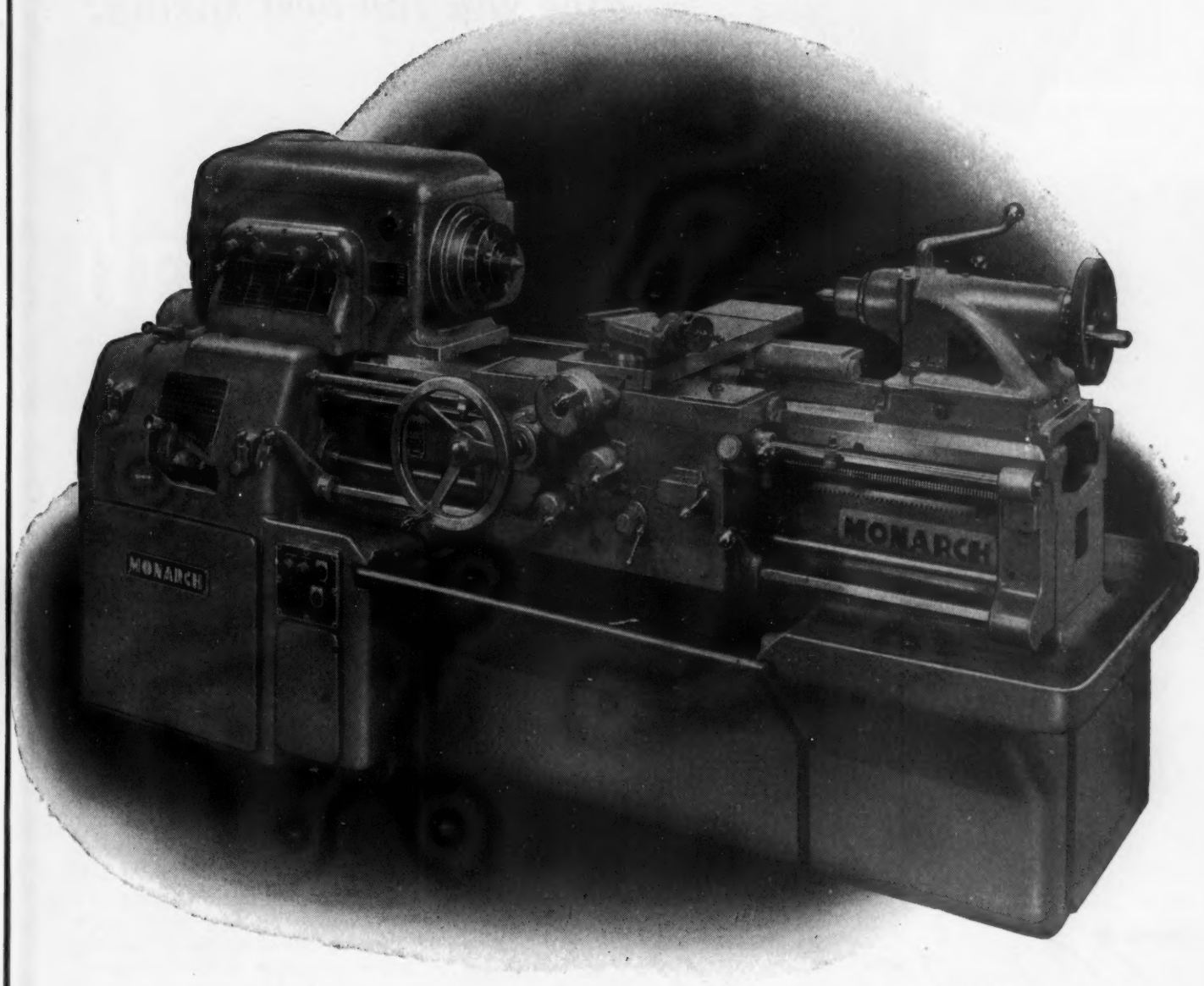
ACCURACY · ECONOMY · LONG LIFE

Monarch
TURNING MACHINES

THE MONARCH MACHINE TOOL CO.
SIDNEY, OHIO

production at a profit

SERIES 60 LATHES



Will specifications alone give you the best spring?

Sometimes, yes . . . but there are times when strict adherence to specifications may present manufacturing difficulties to the springmaker whose cost may reach unnecessary proportions.

Your spring specifications are thoroughly analyzed by Wallace Barnes engineers — not only for suitability of material, dimensional and load tolerances — but also for the best method of production. If there are advantages to be gained by a change in design or material and still give required results, you are advised.

This is just one of many safeguards your order receives when it bears the destination "Wallace Barnes."

Wallace Barnes SPRINGS

SMALL STAMPINGS • WIRE FORMS • HAIRSPRINGS • COLD ROLLED SPRING STEEL

WALLACE BARNES COMPANY
BRISTOL, CONN.

DIVISION OF THE ASSOCIATED SPRING CORP.

AND IN CANADA, THE WALLACE BARNES CO., LTD., HAMILTON, ONTARIO

Production gaging with External Comparator No. 951 and Amplifier No. 950.

NEW! *Electronic* MEASURING EQUIPMENT

. . . by Brown & Sharpe

● EXTERNAL ● INTERNAL

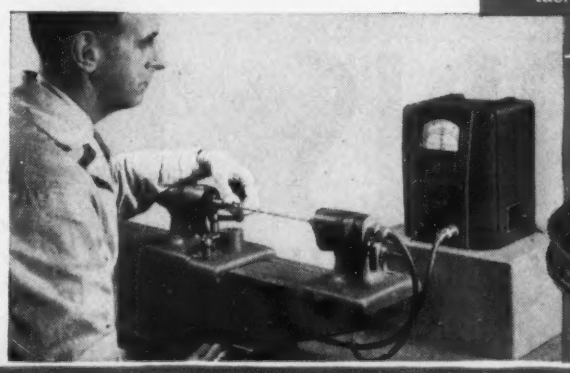
Precision gaging on a mass-production scale is now both practical and economical for any plant or laboratory! The new Brown & Sharpe Electronic Measuring Equipment applies electronic super-sensitivity to measurement, and electronically amplifies the results for instant, accurate reading on a large calibrated dial. It enables accurate gaging to .00001", as fast as test-pieces can be handled.

An outstanding advantage of this new Electronic Measuring Equipment is the separate amplifier unit, which isolates heat-producing elements and prevents temperature drift in gaging units. Another unique feature is the true linear response of the gaging units, which permits accurate setting for the entire scale with only one gage block or master. These are only two of *many* advantages.

Get the full story of this versatile new Electronic Measuring Equipment. Write for details. Brown & Sharpe Mfg. Co., Providence 1, R. I., U.S.A.

We urge buying through the Distributor

Speedy internal gaging with Internal Comparator Attachment No. 952, Amplifier No. 950 and Signal Light Attachment No. 958 (optional).



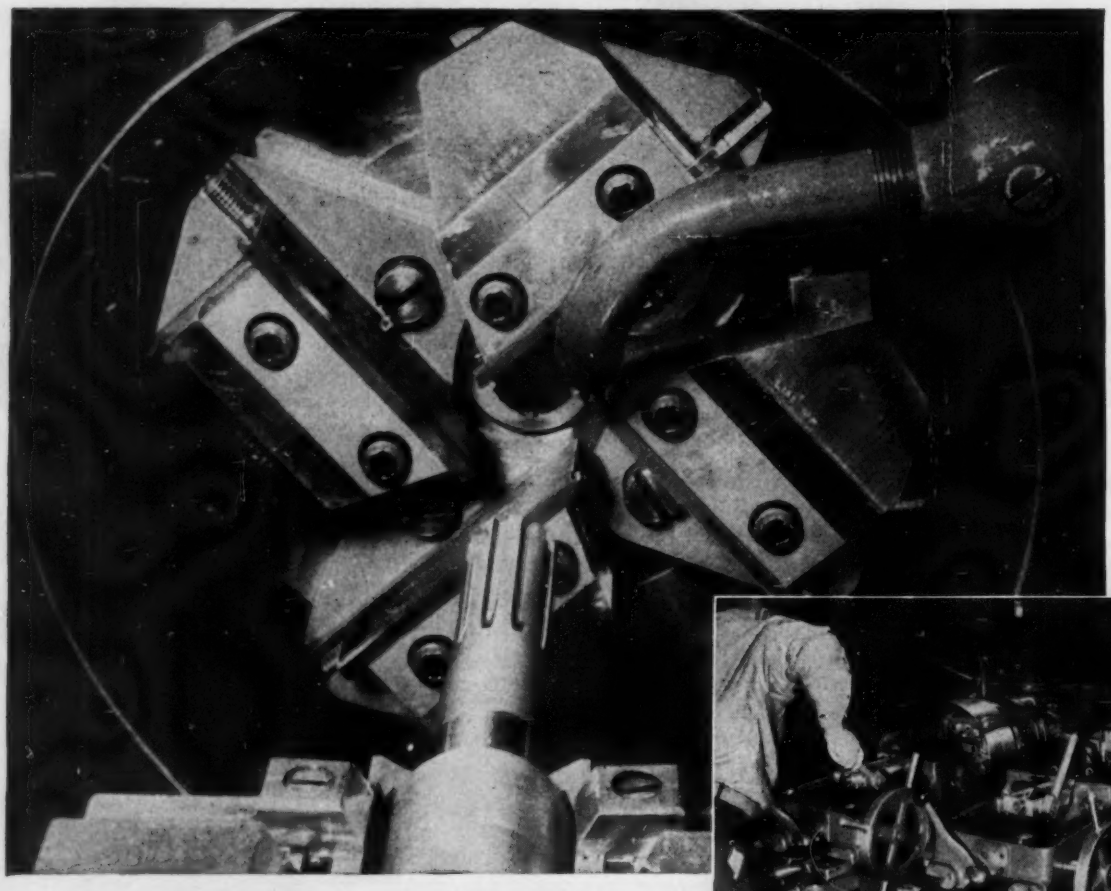
Gage Head Cartridge No. 953 is shown mounted in special fixture for linear gaging.

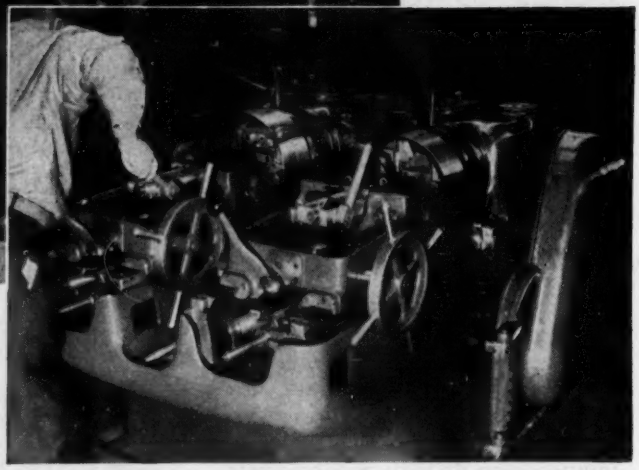
BROWN & SHARPE

Precision Threading with LANDMACO

Landis Threading Machines are used extensively in automotive plants. Accuracy is of prime importance in these operations. Threads must meet the most rigid requirements and must conform exactly to specifications. Besides accuracy, other features include —economy, ease of operation, high productivity, resultant low cost.

Write for Bulletin H-75





The Landmaco Threading Machine threading spiral hypoid drive pinions. These pinions must be precisely made for perfect assembly as, once assembled, they are never expected to require attention.

LANDIS
MACHINE COMPANY
WAYNESBORO, PA., U.S.A.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

. . . but industry cannot rest. More and more scrap is needed for a higher production of steel.

Collect and Ship Your Scrap Now!

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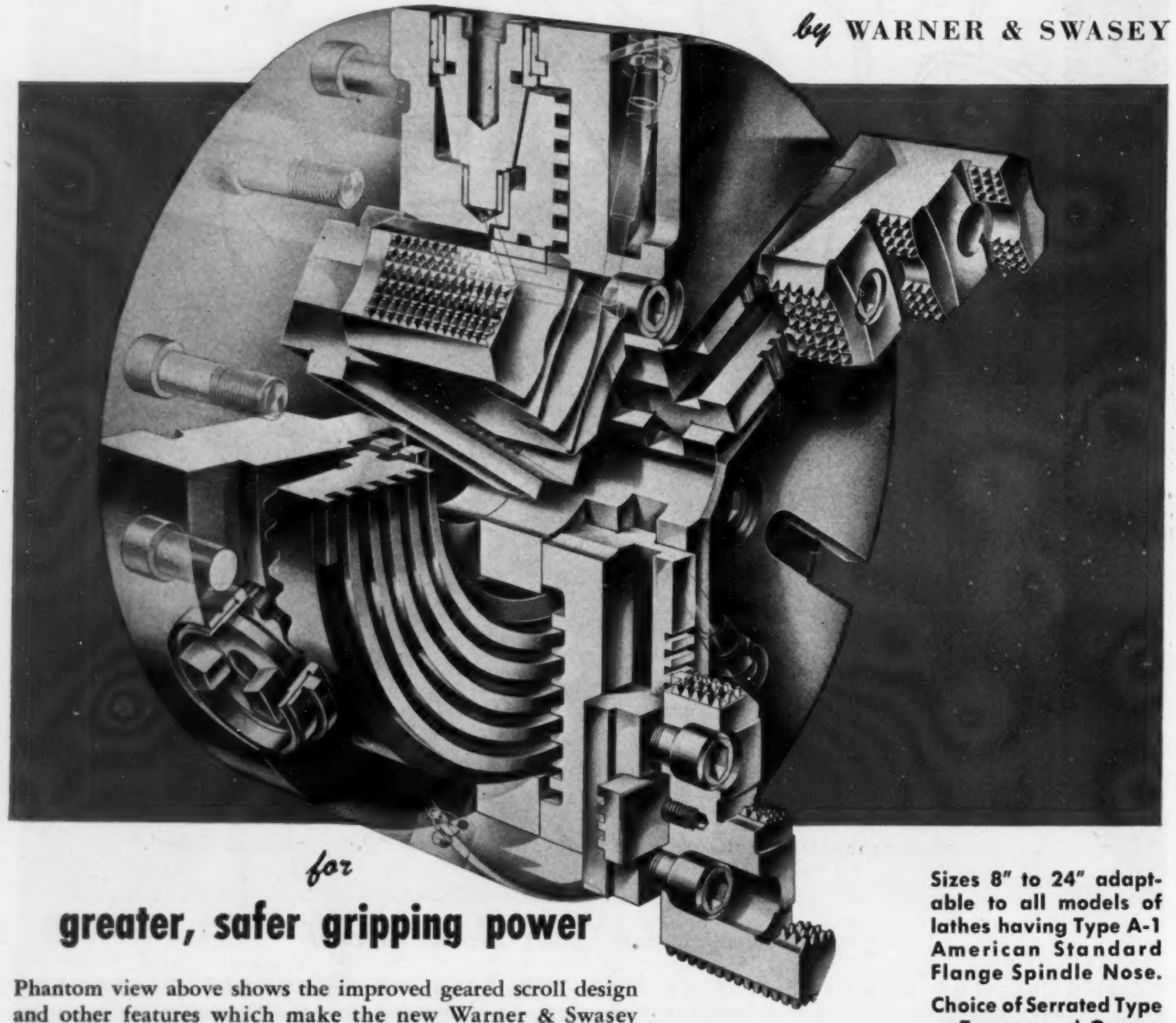
LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Announcing a Complete Line of

GEARED Scroll Chucks

by WARNER & SWASEY



for

greater, safer gripping power

Phantom view above shows the improved geared scroll design and other features which make the new Warner & Swasey chuck so superior for heavy duty, whether operated manually or by a Warner & Swasey power chuck wrench. Alloy steel scroll operates on a large bronze bearing*. Gear teeth of scroll and pinions are generated for greater accuracy and longer wear. Replaceable bronze bushings* support each pinion.

(*Except 8" and 10" sizes which are not used with Power Chuck Wrench.)

For full information on this new chuck line and the many other new developments introduced by Warner & Swasey, see your Warner & Swasey field representative or write Warner & Swasey, Cleveland.

Sizes 8" to 24" adaptable to all models of lathes having Type A-1 American Standard Flange Spindle Nose.

Choice of Serrated Type or Tongue and Groove Type American Standard Top Jaws.

You can machine it better, faster, for less . . . with a Warner & Swasey

WARNER & SWASEY Machine Tools *Cleveland*

TURRET LATHES, SINGLE AND MULTIPLE SPINDLE AUTOMATICS, PRECISION TAPPING AND THREADING MACHINES

PHOSPHOR BRONZE

stands up where other metals fail

WHEREVER METAL is subjected to continuous wear, intermittent stresses or repeated flexings you're likely to find Phosphor Bronze. These important copper-tin alloys are a group of fine-grained metals—strong, tough and corrosion-resistant, yet readily workable.

In bushings, gears and bearings it doggedly resists abrasion. In switches, springs, diaphragms and electrical contacts it retains its high elasticity under conditions where many other alloys would fail.

The American Brass Company offers Anaconda Phosphor Bronze in ten standard compositions (including a free-cutting alloy) with tin contents ranging from 1.25% to 10.5%. In the right form and temper, each does a particular job better than any of the others.

Tell us what you make and how it's used. We'll do our best to help you select the correct Phosphor Bronze Alloy in the most serviceable temper and the most economical form.

47202

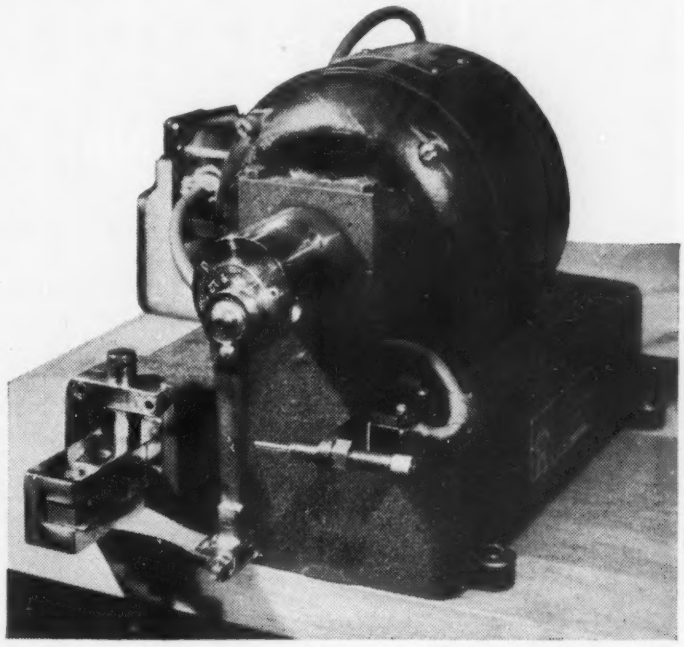
THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

***TESTED TO DESTRUCTION**—so that Anaconda Alloys will have a longer service life. This Phosphor Bronze fatigue specimen withstood approximately 50,000,000 cycles of reversed stress at a deflection corresponding to an initial stress of 25,000 lb. per sq. in. before failure.*



ANACONDA from mine to consumer

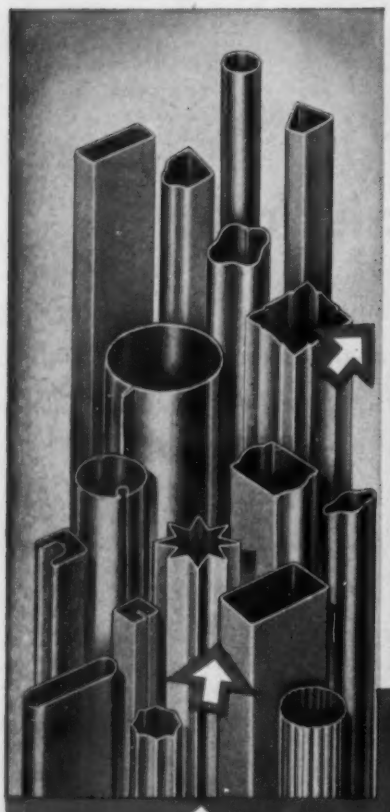
Anaconda

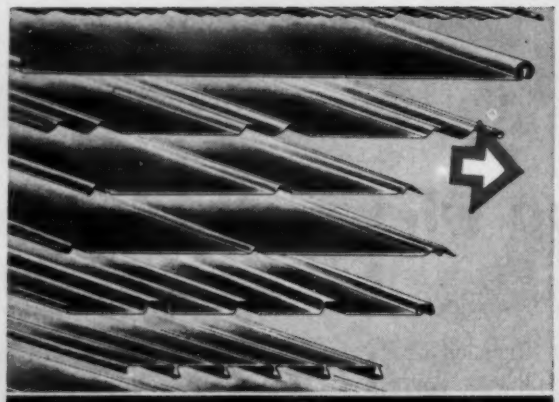
PHOSPHOR BRONZE

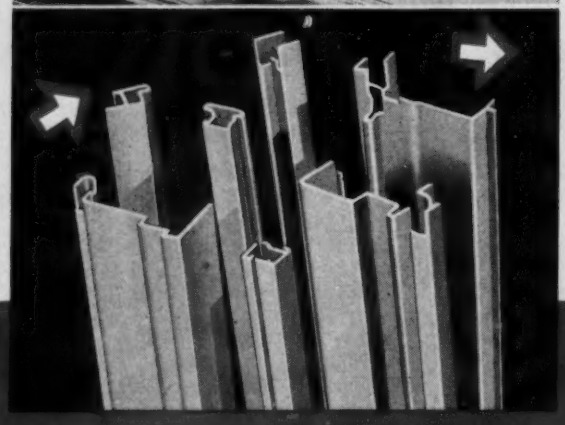
SHEETS, PLATES, STRIPS, WIRE, RODS BARS, SEAMLESS TUBES AND SPECIAL SHAPES

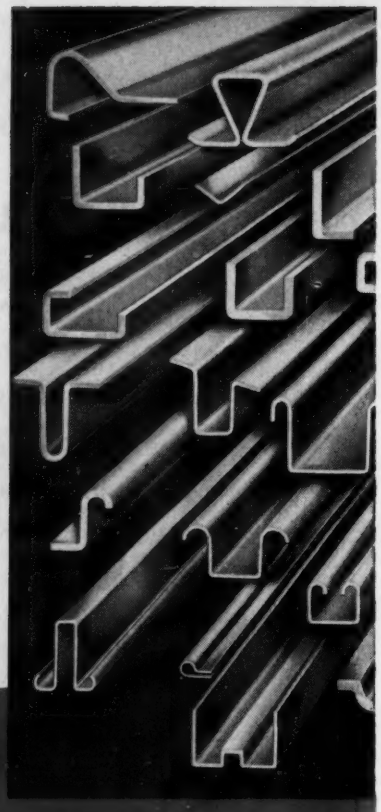
HIGH

TENSILE STRENGTH
ELASTIC LIMIT
RESISTANCE TO FATIGUE
RESISTANCE TO CORROSION
RESISTANCE TO WEAR



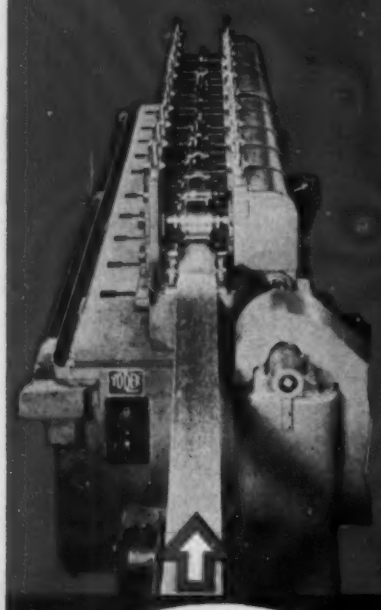






THE SEVEN BIG ADVANTAGES OF COLD ROLL FORMING

(SERIES OF SEVEN) **No. 6 Operating Skill Required**



In the early days of roll forming, the setup, adjustment and operation of the equipment was rightly considered more or less of a mystery to be grappled with only by men of long experience and great skill.

As the demand for roll formed sections insistently grew, the greatest obstacle to satisfying it was the high degree of operational skill required. Recognizing this fact, the Yoder Company set about simplifying, standardizing and refining the design of their machines, making vital parts more accessible, adopting easily adjusted ball and roller bearings, as well as precision instruments and devices for quick and easy tooling and control.

In this they were so successful that any intelligent mechanic can now in a few weeks acquire the elementary knowledge for the successful operation, adjustment, care and maintenance of the machine.

In general, it may be said that the training period is no longer than that required for the simpler types of machine tools. Some men, without previous experience, have become fully competent in five or six weeks, while others require from 14 to 16 weeks, the latter being considered maximum.

Yoder furnishes a simple operating manual and maintains a corps of service engineers to act as instructors wherever and whenever called for by purchasers of their machines.

THE YODER COMPANY
5902 Walworth Avenue • Cleveland 2, Ohio

ENGINEERING
YODER
MANUFACTURING

ROLL FORMING, TUBE MILL AND SLITTING MACHINERY

36 YEARS' LEADERSHIP • COILING • SLITTING • FORMING • EMBOSSING • CURVING • WELDING • CUTTING-OFF

ONE OF A SERIES OF STORIES ABOUT ALLOYING METALS . . . WHERE THEY COME FROM AND HOW THEY ARE USED

THE STORY OF COLUMBIUM

IN HONOR OF AMERICA

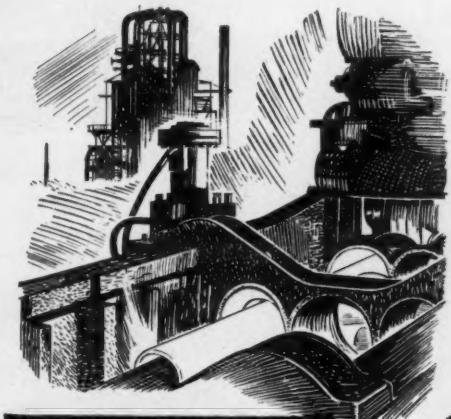
1 In 1801 the British chemist, Hatchett, discovered a new element and named it columbium, in honor of Columbia (America) whence came the mineral specimen he examined. For years this element seemed only an impurity in tantalum, but recently it has gained an important place in metallurgy.

NATIVE CONVEYOR BELT

2 From West Africa and other far-off lands come the ores of columbium, one of the scarcer metals. Here, native labor digs and carries the ore by hand to a modern washing plant which separates the ore from the gangue. From the concentrates, Electromet makes ferrocolumbium.

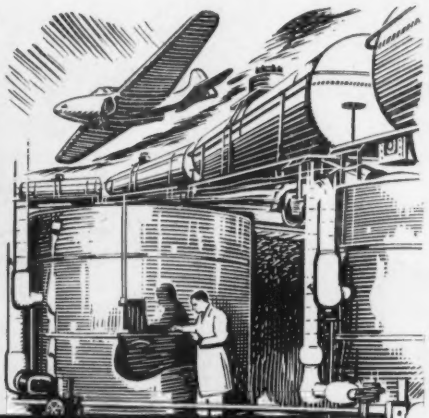
HEAT DOESN'T HURT

3 Columbium preserves corrosion resistance of austenitic chrome-nickel steel when heated to a high temperature. It is unnecessary to anneal welded equipment made of these steels. Fabricators may utilize forgings and castings of a size that could not be properly annealed by commercial methods.



TAKES PUNISHMENT

4 Columbium is essential for improving the creep strength of the super alloys for high-temperature applications such as blades and moving parts of gas turbines and jet propulsion engines. Columbium also reduces air hardening in the straight chromium steels, assuring ductility on cooling.



AID TO FABRICATORS

5 In chrome-nickel stainless steel equipment, welded without annealing, such as large tanks for the chemical, oil, and food industries, columbium preserves corrosion resistance. For high-temperature jobs, such as aircraft manifolds, columbium-bearing chrome-nickel steel is required.

Electromet Has Pioneered

. . . in the development and use of columbium and is the sole commercial producer of ferrocolumbium. If you seek new uses for your stainless or other alloy steels, or are faced with problems in their manufacture or fabrication, let our research staff work with you. Write to Electromet's Technical Service Department for the booklet "Electromet Products and Service." It will tell you more about columbium and other alloys and of our special service to metal producers and fabricators.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

ELECTROMET Ferro-Alloys and Metals are sold by Electro Metallurgical Sales Corporation, and Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

Electromet

TRADE-MARK

Ferro-Alloys & Metals

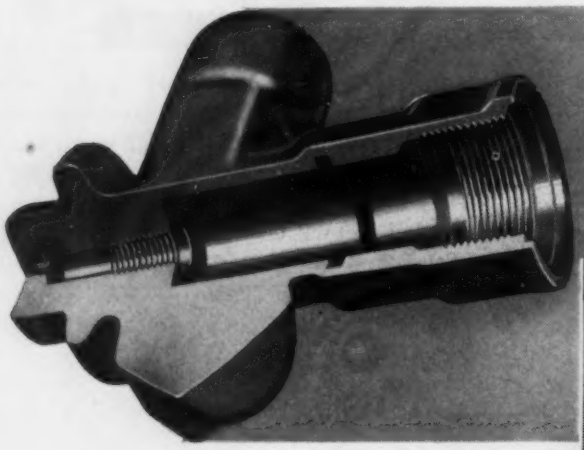
Answer to the question...
"WHERE CAN WE CUT COST?"

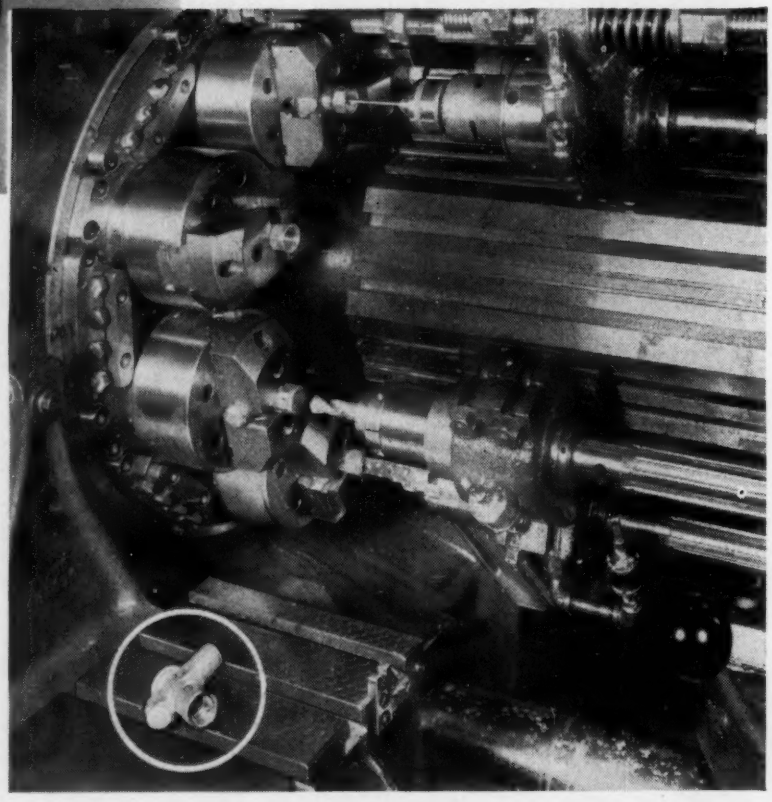
Where wage rates conform to industry-wide standards, and raw material costs tend to be equal for everybody, there is only one place to save, and that's TIME.

Let a faster automatic machine, with improved tooling, turn out more parts per hour, and you have something that soon shows up on the cost sheet.

Acme-Gridley 4, 6 and 8 spindle Chucking Automatics are taking care of this responsibility in many plants producing identical precision parts in quantities.

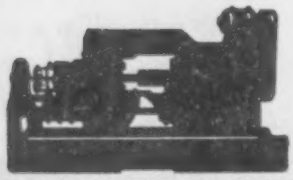
Would you like to see examples of cost-saving time-saving—on the same kind of parts you turn out? We are ready to show you instances, and tell you how to achieve similar results.





Here is one example...

Forged brass valve body, requiring 9 separate operations, completely finished in 13 seconds machine time, 276 pieces per hour, on 6" Acme-Gridley 8 spindle Chucking Automatic—an important kind of production record.



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Maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

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TO MEET YOUR REQUIREMENTS

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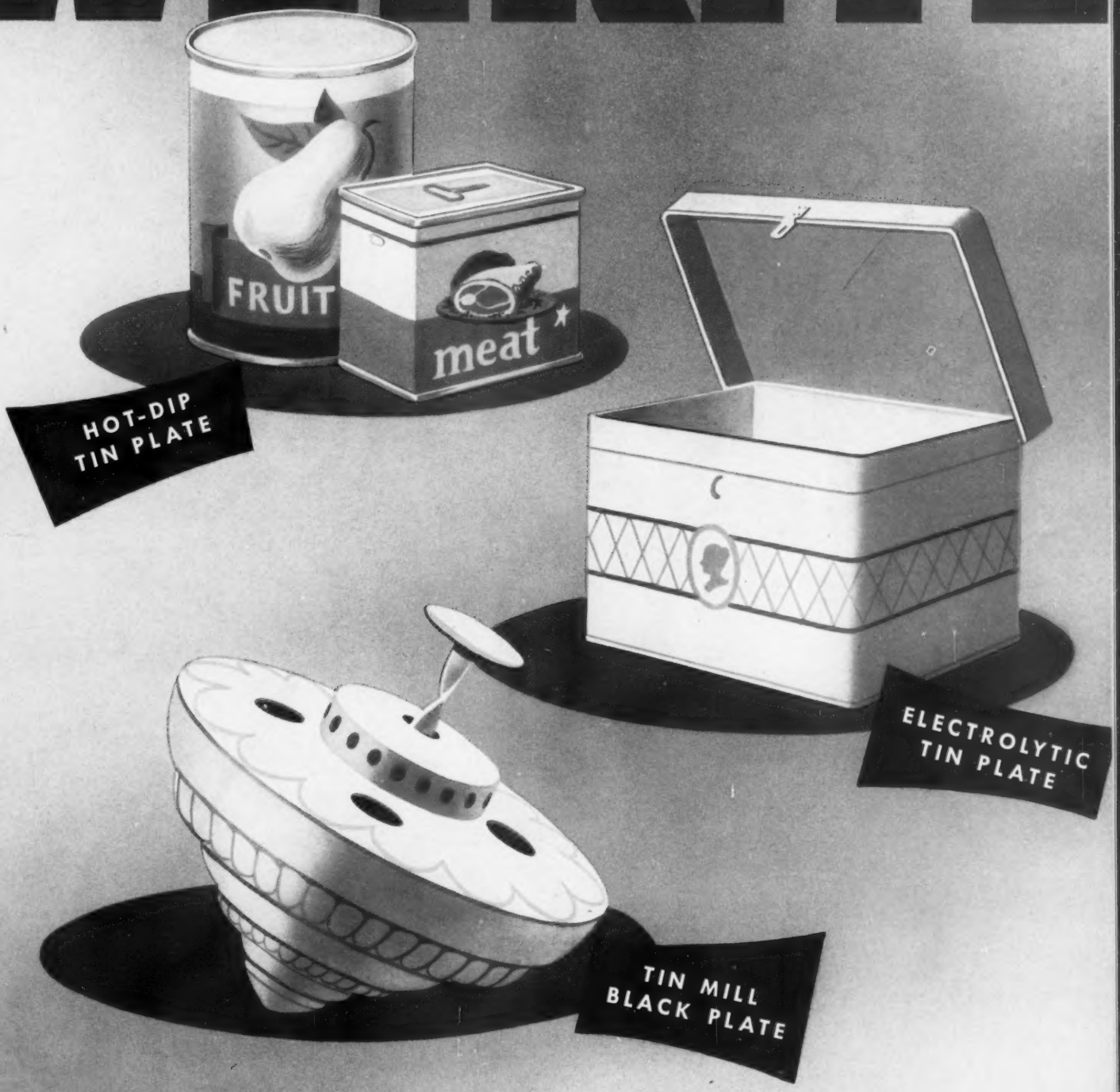

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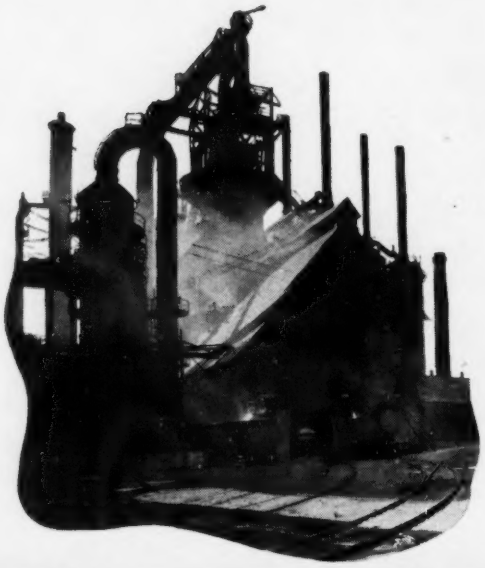

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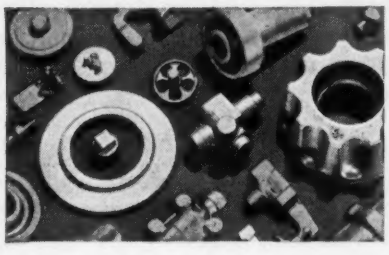
When SCOVILL becomes your METAL-PARTner, YOUR HIGHEST STANDARDS FOR CHROME-PLATED PARTS CAN BE MET

After machining, the top surface of this sink drain flange for a garbage disposal unit is highly polished and chrome plated. Adherence of the plate over a long service life is a prime requisite. Originally made as a sand casting, the inherent porosity of the casting plus tool wear in machining operations resulted in a surface unsuitable for good plating. Brass pressure die castings were also tried and rejected because of porosity. The solution was this SCOVILL forging, which has dense grain structure, relatively thin sections, easy machinability, and complete absence of porosity. Plating troubles were minimized and the required plate adherence obtained.

CHECK WITH SCOVILL

Maybe *your* non-ferrous metal parts would benefit by a change in design or method of production . . . Scovill's long experience in forging will prove of real value to you as it has to others. It costs nothing to find out about the advantages of making Scovill *your* METAL PART*ner*. Just fill in the attached coupon and mail to: Scovill Manufacturing Company, Waterbury 91, Conn. *Export Department:* 405 Lexington Avenue, New York 17, New York.



Please send me information about your metal-working facilities. I am interested in non-ferrous forgings for the applications checked:

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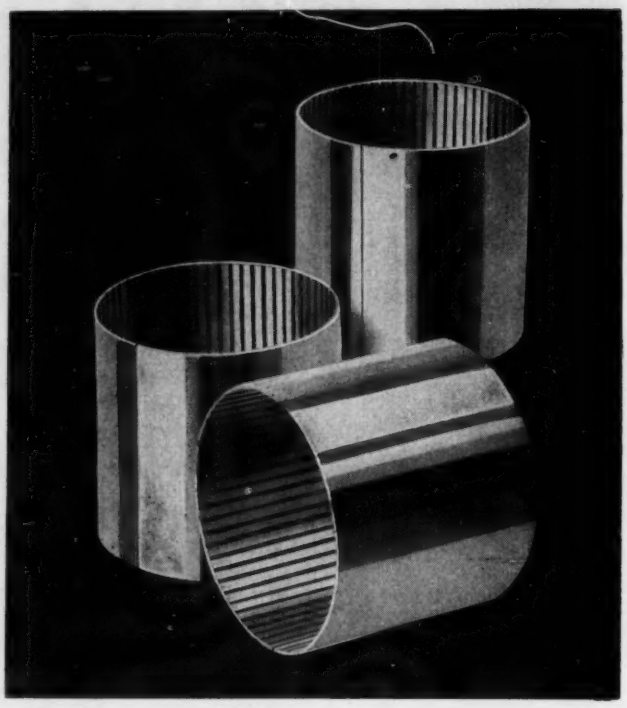
THIN WALL BEARINGS *and* BUSHINGS

Thin wall bearings, which includes a thickness range of $\frac{1}{32}$" to $\frac{7}{64}$" are growing in popularity every day. And rightly so. Engineers and designers appreciate the many distinct advantages such as compactness, extra strength and resistance to pounding plus the comparatively low cost. Excellent delivery is now available on these three types...



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Available in two alloys . . . Johnson No. 40—copper 90; tin .5; zinc 9.5 and Johnson No. 44—copper 88; tin 4; zinc 4. Either of these two alloys will provide excellent bearing characteristics and are low in cost, particularly on long runs. Any type oil groove, slot or oil hole can be secured and the bearings can be graphited or ball indented for grease.

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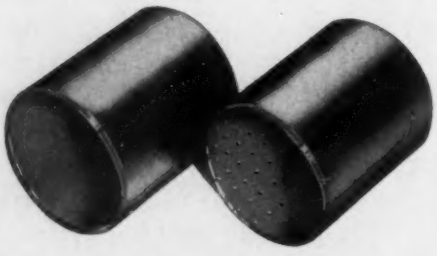
A distinct favorite with builders of internal combustion engines. The famous Johnson Slip-in Bearings are steel and babbitt, now used on so many popular makes of automobiles. The babbitt is permanently bonded to the steel thus assuring long life, smooth operation with a low coefficient of friction.

Pre-Cast Bearing Bronze on Steel



Write today for complete, technical data on all types of Sleeve Bearings. It's FREE!

A new and unusual bearing material that combines the excellent bearing characteristics of a high grade bronze alloy with the strength of steel. Its use permits you to increase speeds and loads . . . to gain longer bearing life with smooth operation . . . plus greater resistance to shock and wear.

Pre-cast Bearing Bronze-on-Steel was developed primarily for sleeve bearings but it also fills many other important applications in industry. It is ideal for stampings, washers, guide strips and other flat pieces. For such purpose we can supply it, promptly, in coils with a maximum width of 5½" and a range of thickness from $\frac{1}{32}$" to $\frac{3}{32}$".

Call in your local Johnson Bronze representative. Permit him to show you how you can use Thin Wall Bearings to your advantage.

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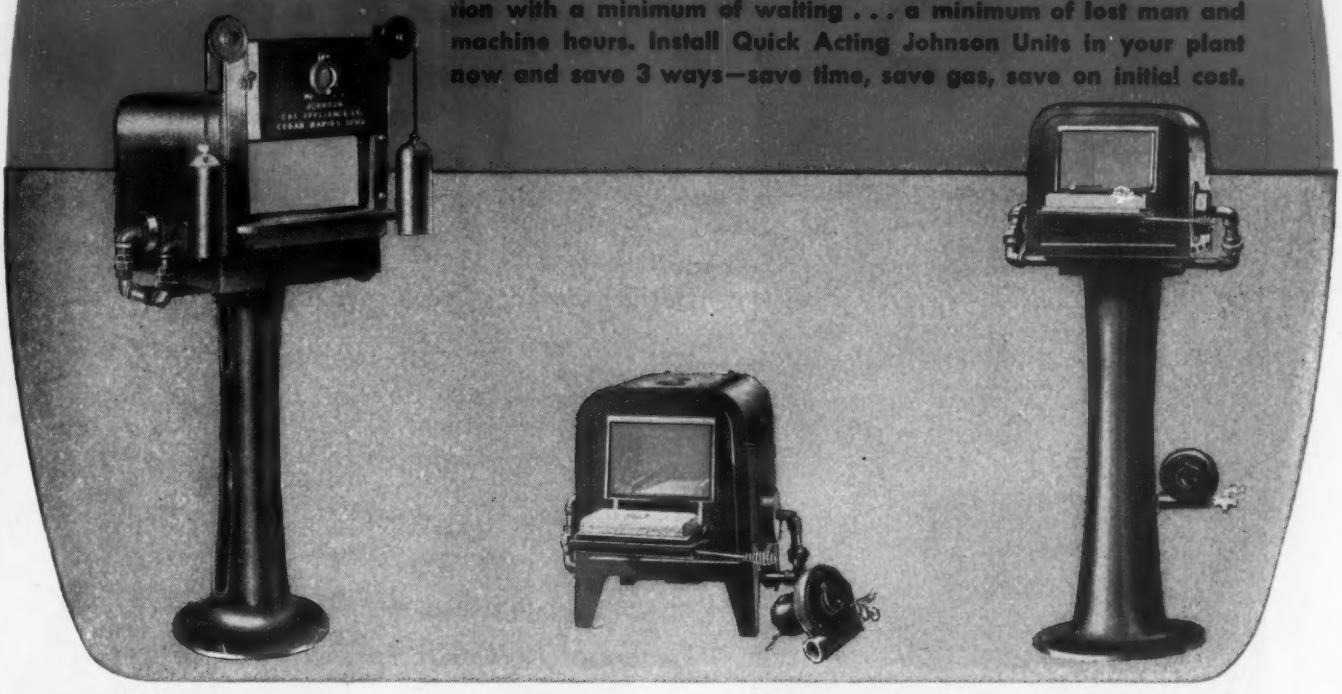
Quick Acting Johnson Furnaces reach high operating temperatures FAST to save time and gas. But more important than their operating economy is the resulting increase in shop efficiency. For with Quick Acting Johnson Units ready for action in your toolroom, high speed steels and other tools are heat treated and back into production with a minimum of waiting . . . a minimum of lost man and machine hours. Install Quick Acting Johnson Units in your plant now and save 3 ways—save time, save gas, save on initial cost.



Johnson No. 130A Hi-Speed

Features counterbalanced door opening upwards. Four-burner unit for steels requiring 1400° to 2350°F. Six-burner unit delivers 1800° to 2400°F. Firebox 7¾x13x16½. Complete with Carbofrax Hearth, G. E. Motor and Johnson Blower.

4-Burner **$295.00** 6-Burner **$325.00**

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Reaches 2250°F. in just 30 minutes. Designed primarily for high speed steels it is equally efficient for hardening ANY steel punches, dies, cutting tools and small metal parts. Firebox 5x7¾x9. Complete with Carbofrax Hearth, G. E. Motor and Johnson Blower **$105.50**

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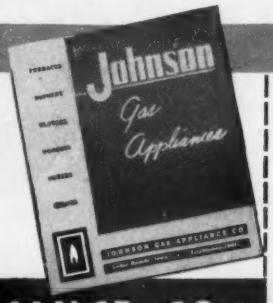

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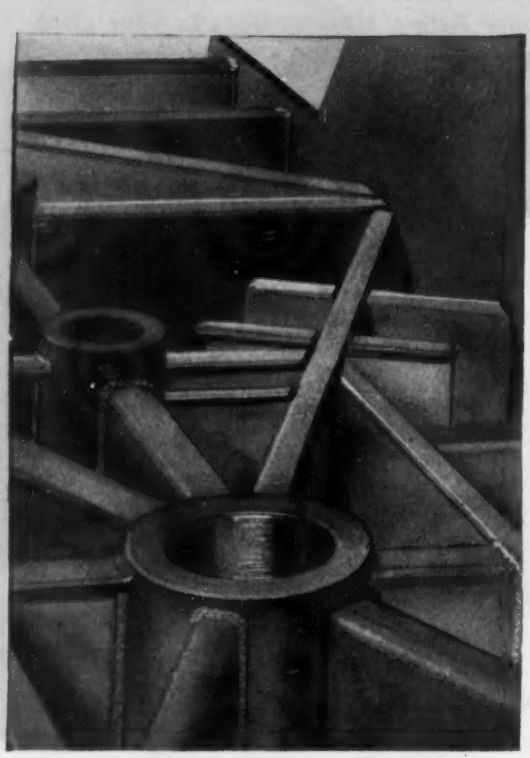
use P&H "PF"
Class AWS-ASTM E6012



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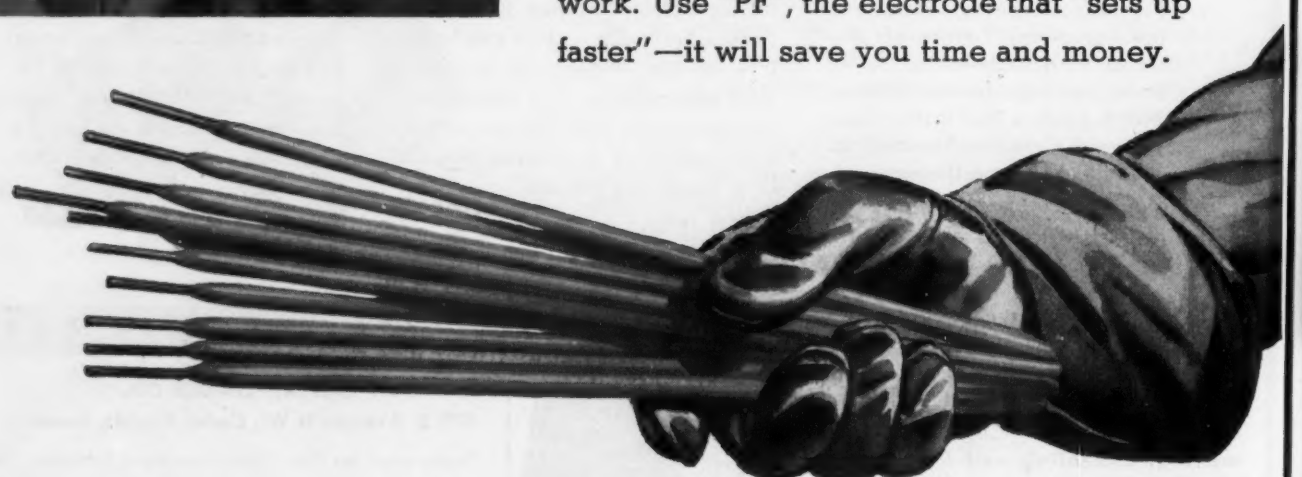

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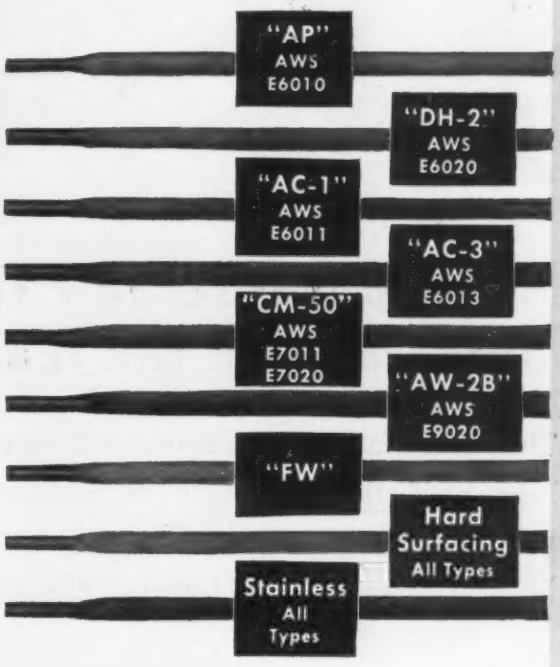

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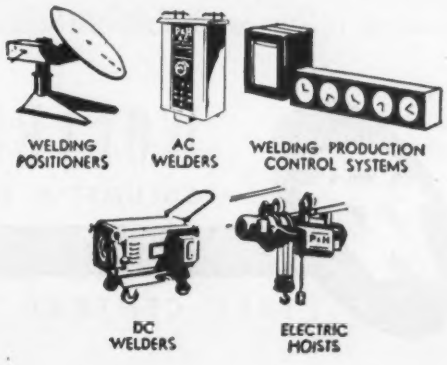
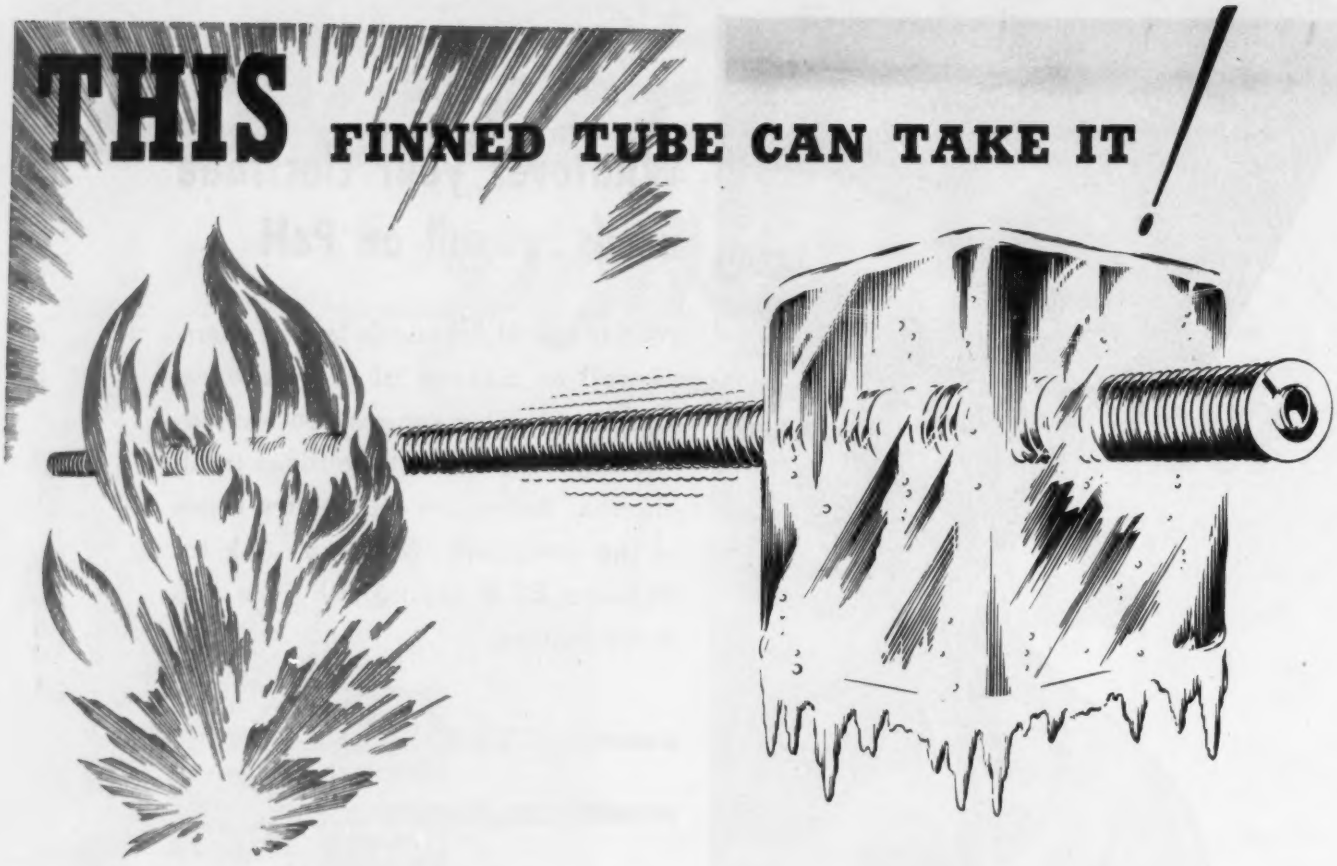
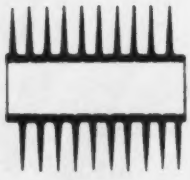


Our representative can help you materially with poor fit-up problems — call him or write us.

THIS FINNED TUBE CAN TAKE IT!



.....because the fins are integral with the tube itself!



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Designers, engineers, production men who know it, specify it. They recognize the economy its use represents in the "extra performance" it delivers—all because the fins are a part of the tube itself. Heat transfer is quick and sure. Trufin is unaffected by vibration.

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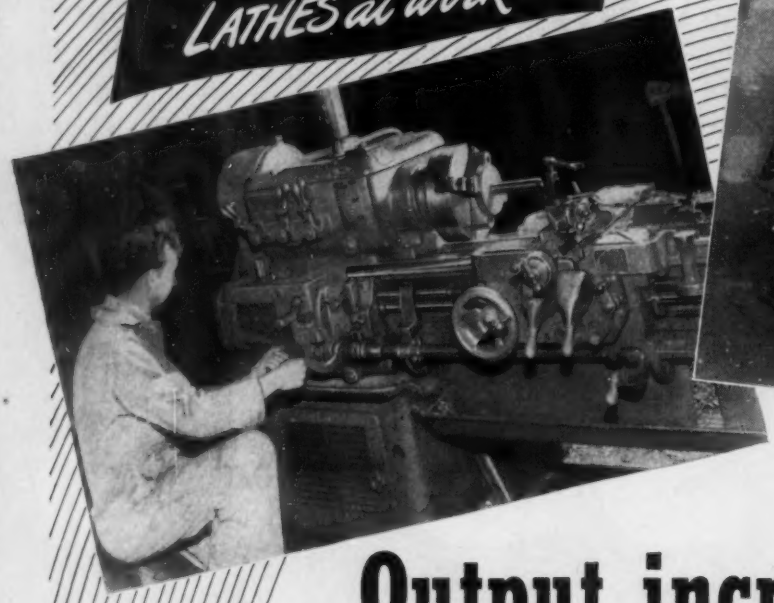
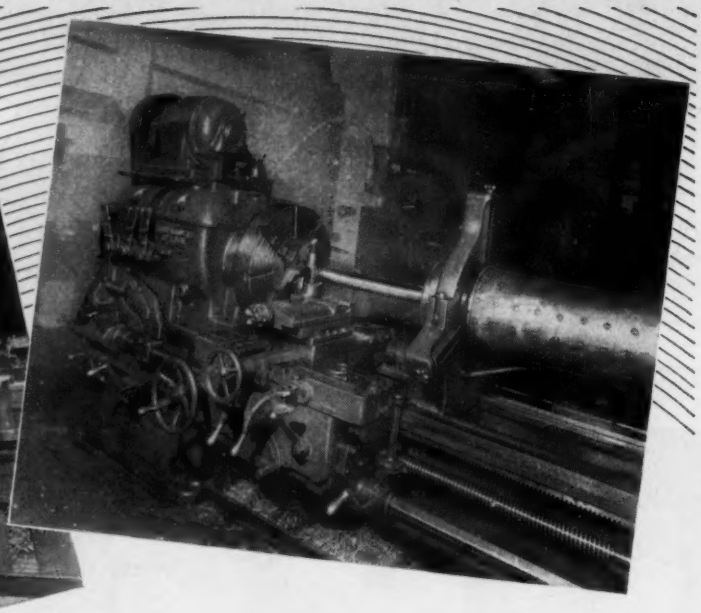
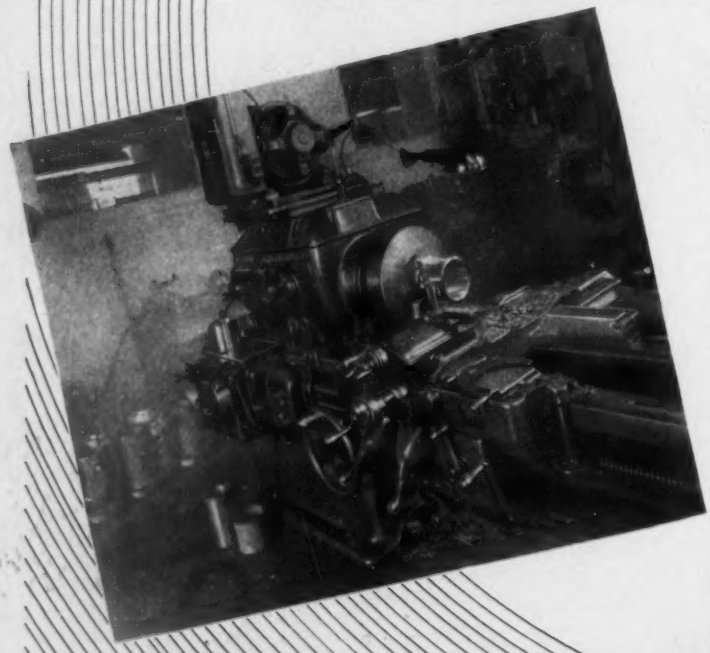
LODGE & SHIPLEY LATHES at work...





Output increased over 100%
Time Saved — 50%

at GENERAL MACHINE WORKS, Chester, Pa.



The infinite variety of jobs produced by General Machine Works quickly proves the worth of a lathe. In the illustrations (top right) a shaft is being turned; (top left) a steel forging (SAE-6145-Rockwell "C" 40/45) is being machined; (bottom) a bronze bushing is being machined to a tolerance of .001".

Significantly, Lodge & Shipley Lathes, used on job shop work by this firm, set impressive records . . . "output increased over 100% . . . time saved . . . 50%." This satisfied owner states . . . "If any more lathes are purchased, they will be Lodge & Shipley . . . and our machinists . . . want L & S tools."

There are more good reasons so many noted manufacturers prefer Lodge & Shipley Lathes . . . your nearby representative will be glad to show you other interesting production and cost studies. Write for Condensed Catalog.

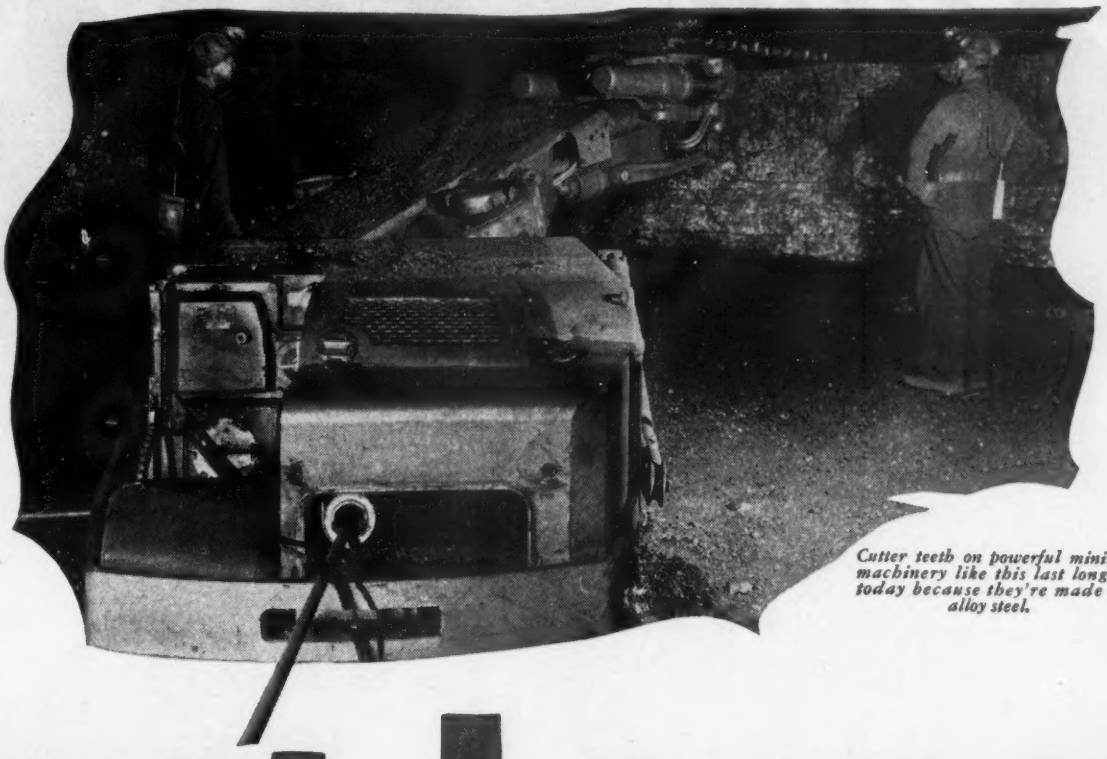
THE WORLD OVER KNOWN · L & S LATHES · FOR GOOD LATHES ONLY

THE Lodge & Shipley COMPANY

CINCINNATI 25, OHIO

MACHINE TOOL DIVISION • 3055 COLERAIN SPECIAL PRODUCTS DIVISION • 800 EVANS ST.

Alloy Steels



Cutter teeth on powerful mining machinery like this last longer today because they're made of alloy steel.

Last Longer

THAN ANY OTHER MATERIAL

—That's because alloy steels respond uniformly to heat treatment and produce hard working surfaces in countless types of machinery—surfaces that wear longer than any other material.

—That's because alloy steels are stronger than other materials—provide needed strength even when used in thinner, weight-reducing sections.

—That's because alloy steels are tough—able to withstand severe strain, shock, vibration and sudden reversal of stress.

—That's because alloy steels resist fatigue—insure safety.

—That's because alloy steels maintain their strength under wide temperature extremes.

Because of these qualities, alloy steels continue to do their job long after other materials have worn out or failed in service.

Let Republic—world's leading producer of alloy steels—tell you more about their advantages. Write to:

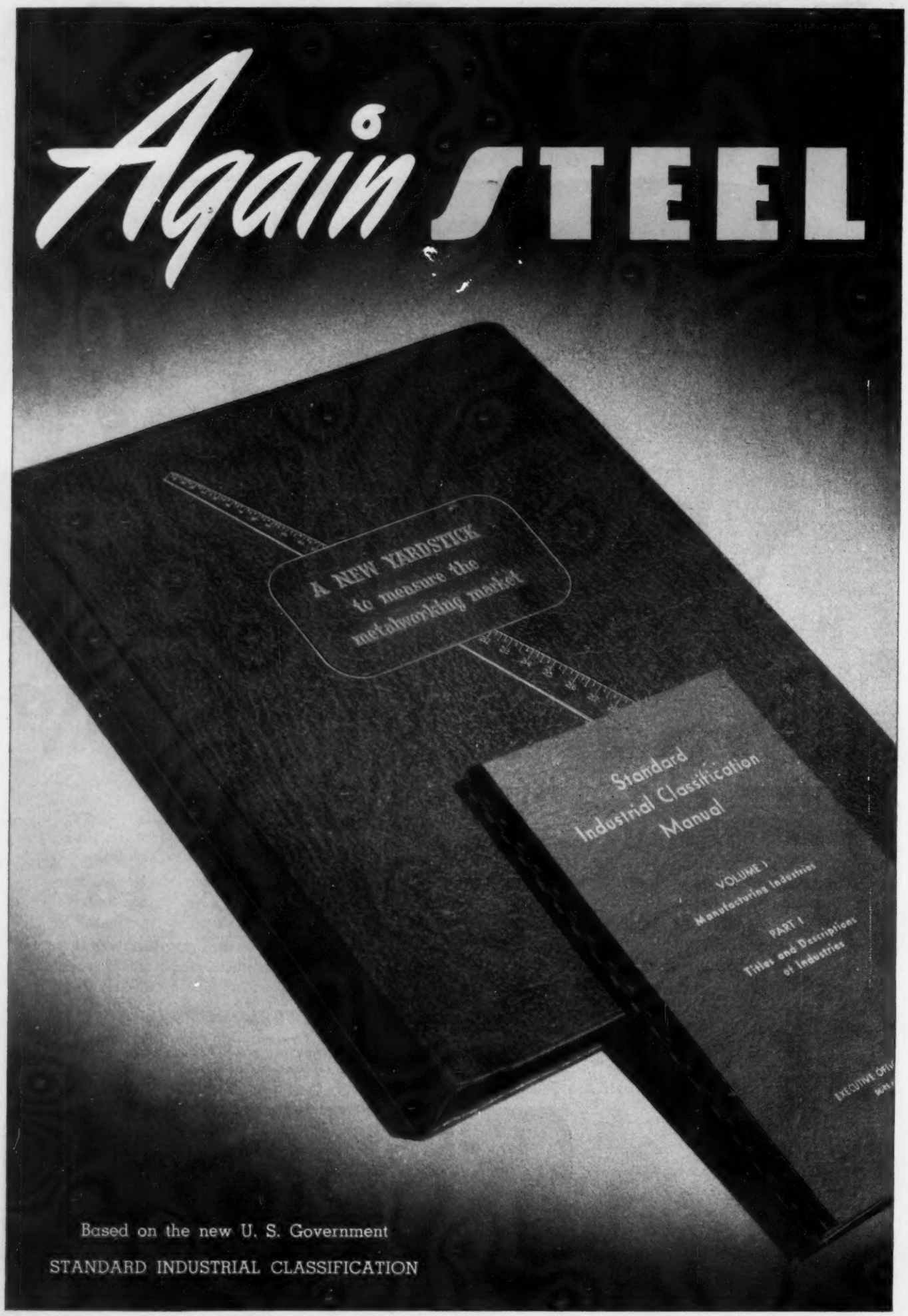
REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

REPUBLIC STEEL
REG. U.S. PAT. OFF.

Republic
ALLOY STEELS

Other Republic Products include Carbon and Stainless Steels—Sheets, Strip, Plates, Pipe, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

Again STEEL



Based on the new U. S. Government
STANDARD INDUSTRIAL CLASSIFICATION

is First

with a new yardstick to help measure the Metalworking Market

To help you with your advertising and sales planning, STEEL has just completed an industry-wide market study based on the government's new system of Standard Industrial Classification. Ask the man from STEEL to show you "A NEW YARDSTICK TO MEASURE THE METALWORKING MARKET."

Why This New Standard Industrial Classification System?

It has been issued by the government in order to *standardize* all industrial statistics, and to make marketing information from all sources *uniform* and *comparable*. Eventually, most market information will be made available on this basis.

Can STEEL Give You Up-To-Date Market Data on Metalworking Now?

Always the leader with latest metalworking developments, STEEL is ready now to give you the most complete and up-to-date market information. It was gathered through a penetrating census of over 30,000 metalworking plants.

When Will the Government Issue Census Statistics on This New Basis?

The next Census of Manufactures will be based on this Standard Industrial Classification but will not be available for nearly a year.

What Can STEEL Tell You About Your Metalworking Market?

More than ever before. STEEL's "New Yardstick" will help you determine your sales potential in metalworking's 55 billion dollar market. It goes deeper into your market—with a finer breakdown than ever before. It will help you measure your sales possibilities in many ways: by products made —by operations performed—by size of plant and geographical location.

Ask the man from STEEL to show you "A New Yardstick to Measure the Metalworking Market."

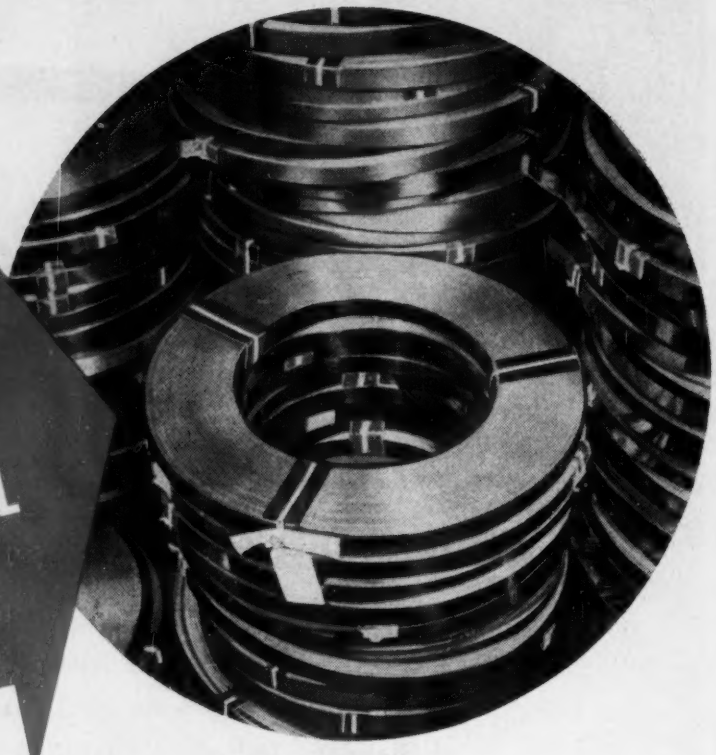
A PENTON PUBLICATION

THE PENTON PUBLISHING CO.

PENTON BUILDING

CLEVELAND 13, OHIO

WHERE DOES HIGH QUALITY BEGIN IN SPECIALIZED STEEL LIKE THIS?



Sandvik Cold-Rolled, High Carbon Steels' Superior Physical Properties Start with The Ore

The iron ore that ultimately becomes Sandvik steel is among the purest obtainable, containing only insignificant amounts of sulphur and phosphorous.

This ore is crushed and concentrated, then sintered to further purify it. Then it is smelted in small furnaces, using phosphorous-free charcoal obtained from coniferous forests.

The high grade pig iron thus produced is combined with equally pure scrap and the steel is refined in acid open-hearth furnaces. The small size of these furnaces facilitates more accurate control.

Sandvik's skill born of many years of steel-making experience performs the many subsequent operations needed to fit it for exacting, special uses.

If you have an application that calls for above ordinary quality in cold-rolled high carbon or alloyed strip steel, 'phone or write Sandvik. Available unannealed, annealed or hardened and tempered. Complete information and stock lists will be sent to you promptly on request.

55-21

BLAST FURNACE PIG

CHARCOAL

SOME SANDVIK SPECIALTY STRIP STEELS

Band Saw Steels • Clock and Watch Spring Steels Compressor Valve Steel • Conveyor Belting • Doctor Blade Steel • Feeler Gauge Steel • Knife Steels — Art, Surgical, Textile, etc. • Magnetic Sound Recording Tape • Piston Ring Segment and Expander Steels • Razor Blade Steel • Reed Steel • Shim Steel Sinker Steel • Spring Steels • Textile Steels • Vibrator Reed Steel • Wood Band Saw Steel.

Sandvik Quality Steels

SANDVIK STEEL, INC.

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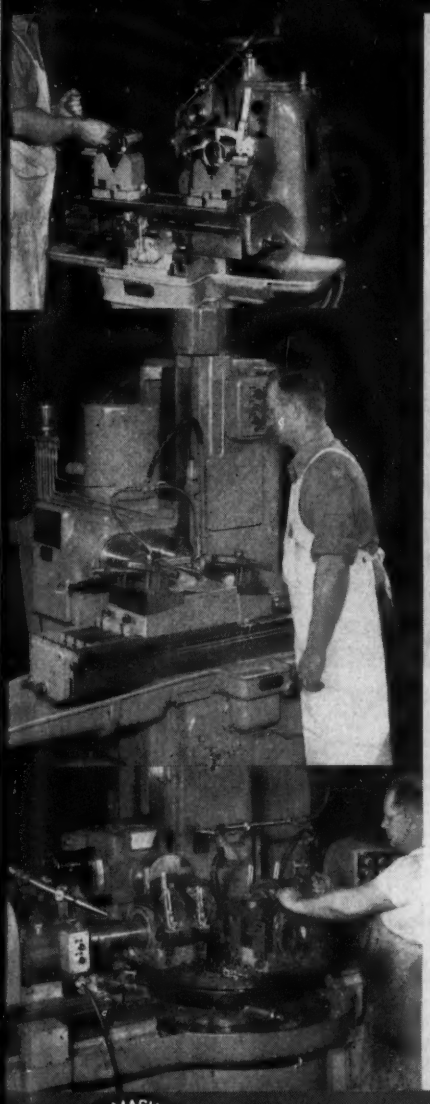
180 N. Michigan Ave., Chicago 1, Ill., FRAnklin 1745
1736 Columbus Rd., Cleveland 13, Ohio, CHerry 2303
WAREHOUSES: New York and Cleveland

You'll Get Practical Milling Methods Like These with.. SUNDSTRAND "Engineered Production"



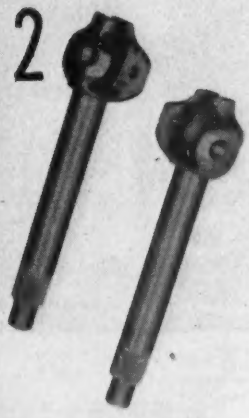
— Basically, there are two approaches to solving milling production problems, (1) obtaining standard machines, then trying to process parts over these machines as economically as possible, (2) designing the most profitable processing method, then obtaining machines to suit this method — standard or semi-standard machines, if possible, or entirely special machines, if necessary.

This latter method is Sundstrand "Engineered Production" . . . the most practical approach to economical milling. The following is a brief resume of the complete engineering and manufacturing service available from Sundstrand to meet all or any of your production milling requirements in small and medium size work.

These actual examples are presented to reveal one of each of the methods used in solving milling production problems. One of these methods may be the solution to your present problem.

MILLING 204 PISTONS PER HOUR WITH STANDARD RIGIDMIL This Sundstrand No. 00 standard Hydraulic Rigidmil is tooled to mill the expansion control slot in automotive pistons. It has a single horizontal spindle with speeds from 85 to 3600 rpm. The table is 7½" x 25" and has 8" of travel with a range of feeds from ½ to 37 inches per minute. The table is provided with work holding fixtures and a standard two-way automatic cycle. Consequently the operator loads in one fixture while work is being performed in the other. Loading time is free making it possible to mill 204 pistons every hour.

2



STANDARD RIGIDMIL WITH SPECIAL HEAD MILLING INTERNAL SLOTS SIMULTANEOUSLY Opposite slots inside of these gear shafts are milled on this standard Sundstrand Rigidmil provided with a special head. Quills have power movement endwise to bring cutters in and out of cutting position. The spindle head is provided with vertical power movement in combination with table movement to provide a rectangular cycle operating in a vertical plane. A special 2 spindle head replaces standard head so that 2 parts can be milled sumultaneously.

3

SPECIAL THREE HEAD RIGIDMIL MILLS, ROUGH AND FINISH BORES SIMULTANEOUSLY This four station special Rigidmil machines magnet frames in the following sequence: rough boring at station 1, face milling at station 2, finish boring at station 3, and loading and unloading at station 4.

This machine replaces a conventional multiple tool lathe and, in addition, includes a milling operation.

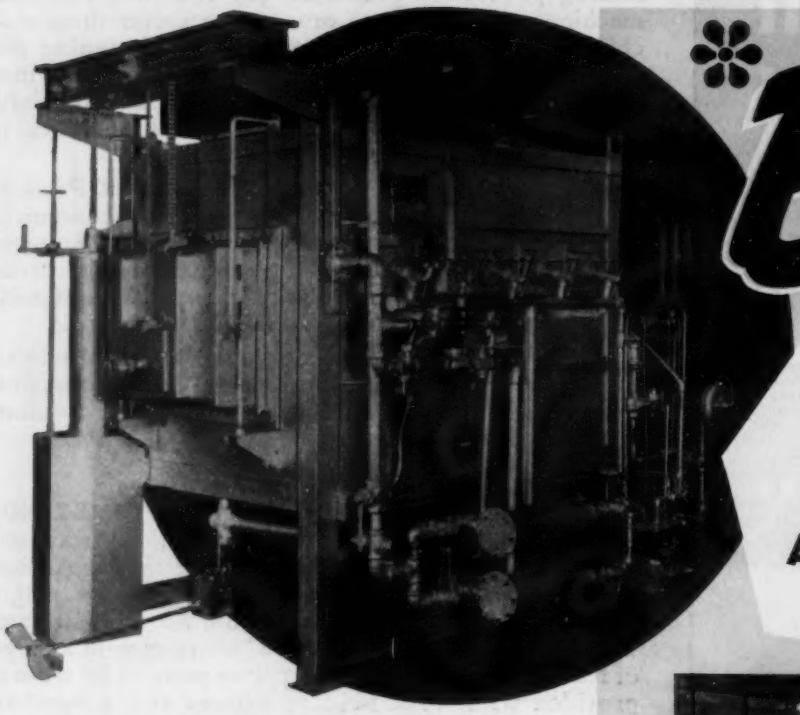
The machine cycle consists of rapid approach, feed, dwell and rapid return automatically. The cycle is timed and interlocked with the 90° indexing fixture which presents the work in exact relation to the tools. No relocation or repositioning of the part is required. Various models of magnet frames are accommodated on this one special Sundstrand Rigidmil.

FREE ADDITIONAL DATA: Write for more proof of the successful application of Sundstrand "Engineered" milling production. This new 40 page book contains over 35 actual problem solutions together with interesting tooling diagrams. Write for your copy today. Ask for bulletin No. 766.

SUNDSTRAND MACHINE TOOL COMPANY

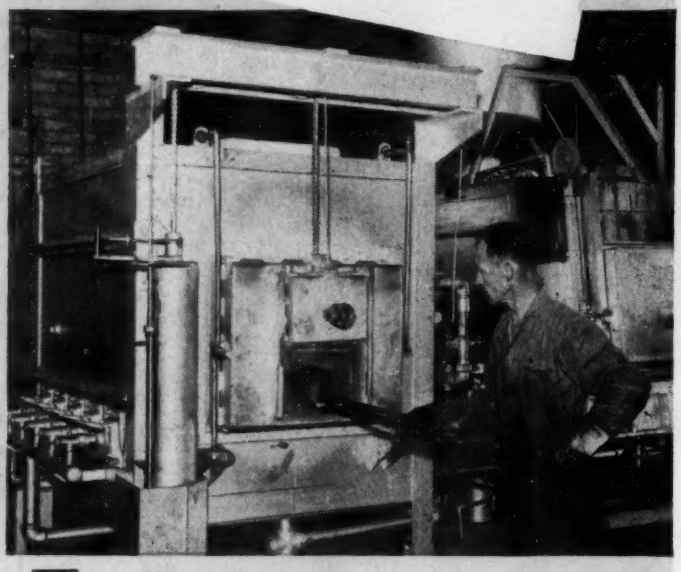
2540 Eleventh St. • Rockford, Ill., U.S.A.

RIGIDMILS • AUTOMATIC LATHES • SPECIAL MILLING AND TURNING MACHINES



*Balco

The New CONTROLLED-CARBON ATMOSPHERE FURNACE



MOST OPERATIONS LEAST INVESTMENT

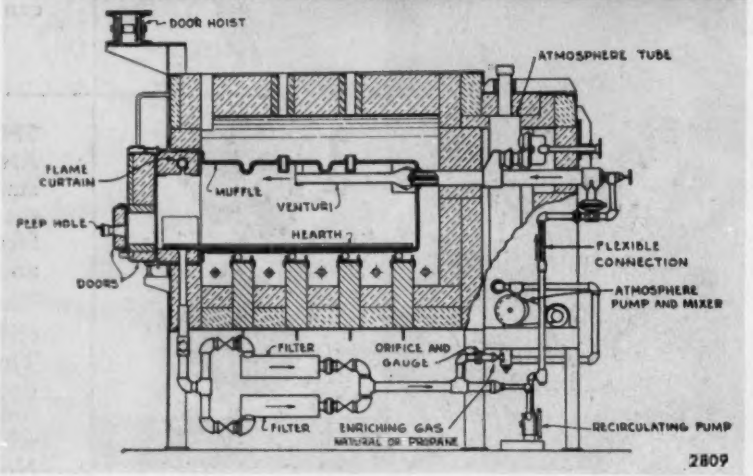
The new Balco Furnaces provide clean, scale-free hardening, gas carburizing, and carbon restoration of plain and alloy steels. This is accomplished by the accurate control of the carbon potential of the atmosphere.

The Balco Furnace is a **Standard-Rated, Gas-Fired, Atmosphere Furnace of the muffle type with an integral RX atmosphere generator, and is available in three types—two for clean hardening and one for gas carburizing. Of the former, one type has a temperature range from 2000° to 2400° F, the other from 1400° to 1850° F. The range of the gas carburizing furnace is from 1400° to 1850° F.

The Balco Furnaces make available to the small furnace user a multiple-purpose unit for clean hardening, gas carburizing, carbon restoration, and other carbon controlled heat treatments. One such Balco unit in operation in a large commercial heat treating plant has successfully processed 67 different grades of tool steel.

* BALANCED $\frac{CO}{CO_2}$

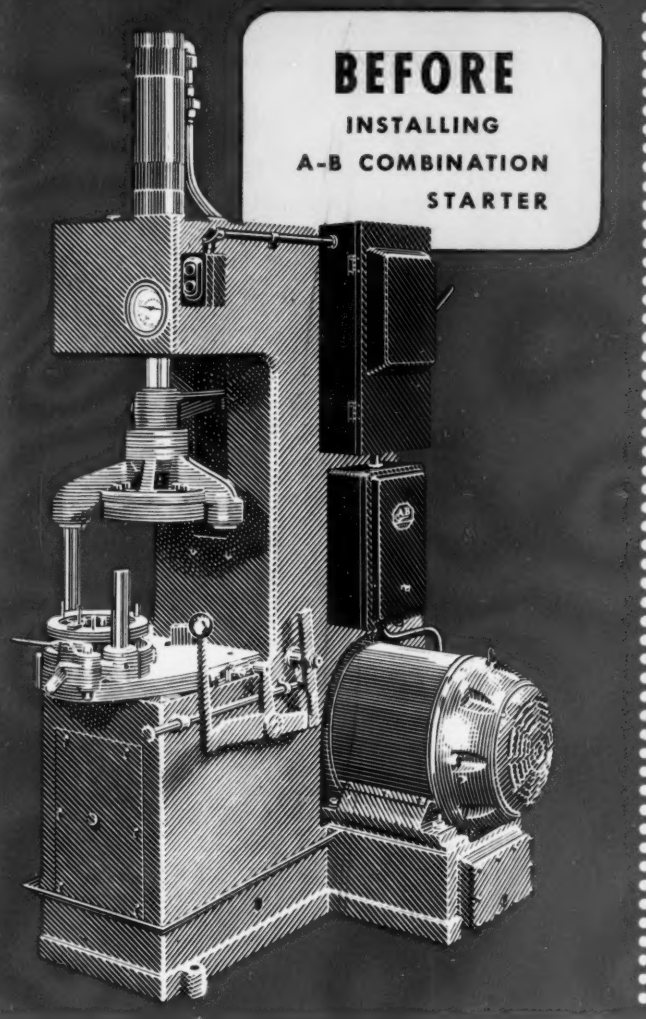
Write for full details and performance figures.

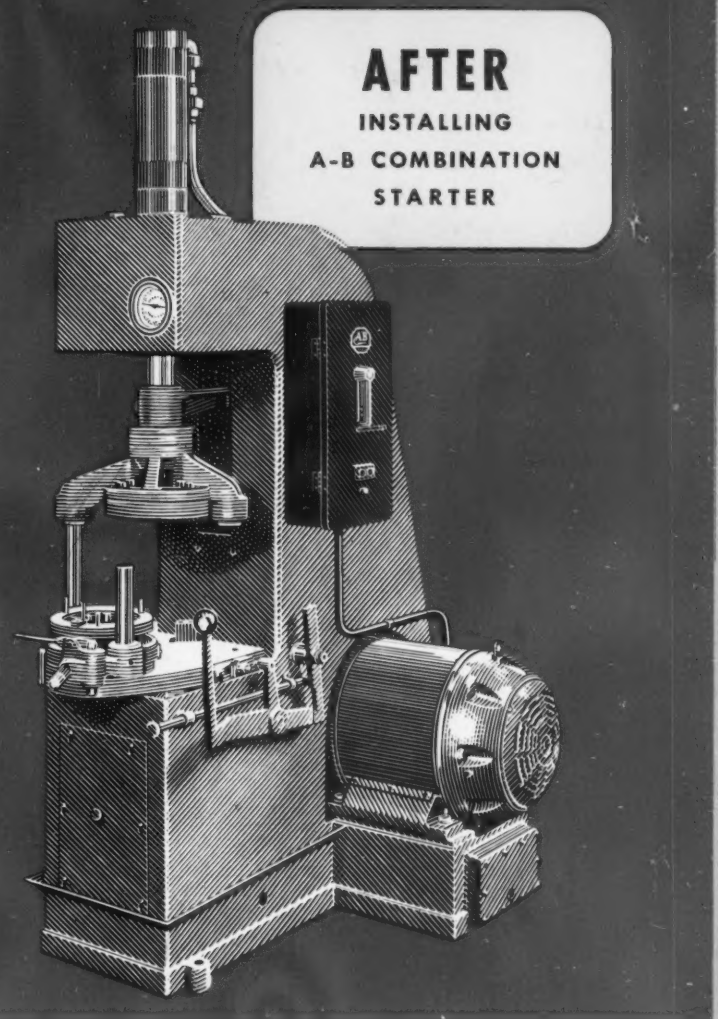


** Every 'Surface' Standard Furnace is rated so that you can tell in advance the exact production, fuel consumption, and all other operating data. This is an exclusive feature that no other furnaces have.

'Surface'

SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

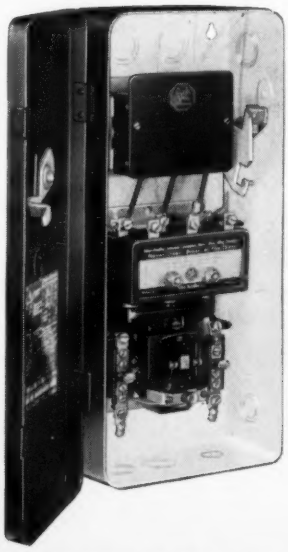




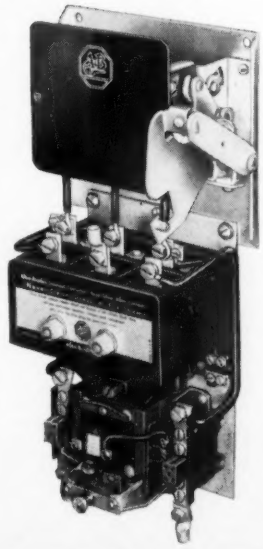
THREE UNITS REPLACED BY ONE COMBINATION STARTER

Saves Space—Reduces Cost—Makes Neater and Safer Installation

BULLETIN 712 COMBINATION STARTER



Cover cannot be opened unless disconnect lever is "OFF."



Disconnect unit and switch are mounted on one back plate.

● Compactness . . . that is a requirement of modern machine tool design.

For example: The old way (see above) called for three separate units . . . (1) disconnect switch . . . (2) motor starter . . . and (3) push button station.

The new way (see above) calls for ONE unit . . . an Allen-Bradley Combination Starter, with push button, magnetic switch, and disconnect unit in ONE neat cabinet.

This compact construction saves space . . . reduces cost . . . makes a neater and safer installation. For full information send for Bulletin 712-713 describing A-B Combination Starters in various types of enclosures.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

ALLEN-BRADLEY

COMBINATION STARTER

The Starter that introduced a New Era *in Automatic Motor Controls*

When Allen-Bradley engineers combined the straight-line motion of a solenoid plunger with the high arc-disruptive action of confined, silver alloy contacts, a new era in automatic motor controls was born.

The Solenoid Principle

The solenoid principle permitted a switch design of unmatched simplicity . . . a starter so devoid of trouble-breeding parts, like pins, pivots, bearings, etc., that the Allen-Bradley solenoid starter was recognized everywhere as "trouble-free."

The Contactor Design

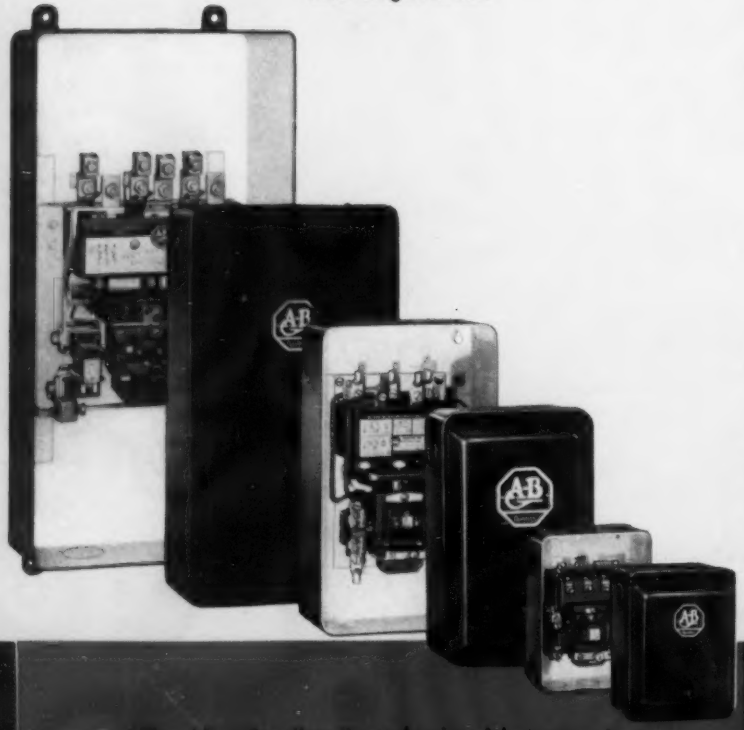
The contactor design, utilizing double break contacts of Allen-Bradley patented silver alloy, did away with the old, complex arrangements of lever arms, hinges, flexible jumpers, and rolling-type contacts.

For the first time in all control history, the feature of NO CONTACT MAINTENANCE was made available to control users.

Double break, moving contacts mounted on insulating crossbar.

Today, every Allen-Bradley solenoid starter carries the instruction—"NEVER CLEAN, FILE, OR DRESS THE CONTACTS." Why? Because the silver oxides which may form on the contact surfaces are good conductors. To file the contacts would only waste valuable contact life.

You can install Allen-Bradley Bulletin 709 Solenoid Starters . . . and forget them.



The Allen-Bradley line of solenoid starters includes six sizes, ranging up to 200 hp. White cabinet interiors make wiring easy. Enclosures are available for every service.

Sectional View of A-B Solenoid Switch without Overload Relays.

Only ONE Moving Part

DEPENDABLE, TROUBLE-FREE PERFORMANCE

. . . Precision High-Speed Switching for Automatic Sequence Controls

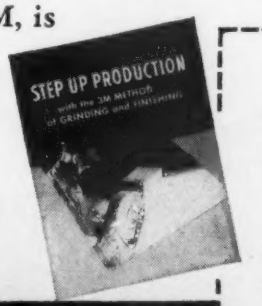
Freedom from complicated linkages, pivots, and hinges makes the simple Allen-Bradley solenoid switch ideal for controlling machine tools. Allen-Bradley switches open and close with split-second accuracy . . . not once or twice . . . but continuously. Such precision is now accepted as "standard" by many machinery builders who depend upon Allen-Bradley controls for high-speed, sequence operation of their machine tools.

Let us send you Bulletin 709.
Allen-Bradley Co., 1316 So. Second St., Milwaukee 4, Wis.

ALLEN-BRADLEY
QUALITY
SOLENOID MOTOR CONTROL

GRINDING TIME REDUCED 49%

A leading manufacturer of metal kitchen cabinets has found, in 3M Backstand Belts and 3M Contact Wheels, a way to cut grinding and finishing time in half. Corner welds and seams are given a smoother, cleaner finish in a fraction of the time—and at a fraction of the cost—required by other methods. In hundreds of other plants this high speed grinding and finishing method, developed and pioneered by 3M, is setting new standards for finishing speed, finishing quality and finishing economy. For complete information on the 3M Method of Grinding and Finishing, see your distributor of 3M Abrasive Products or mail the coupon below for our new "Step Up Production" Booklet.



3M BACKSTAND BELTS

Made in U.S.A. by
MINNESOTA MINING & MFG. CO.
THE 3M COMPANY
Saint Paul 6, Minn.

S 1247

MINNESOTA MINING & MANUFACTURING COMPANY
Saint Paul 6, Minnesota

Please send us a copy of your new booklet describing the 3M Backstand Method of Grinding and Finishing.

Name_____

Firm_____

Address_____

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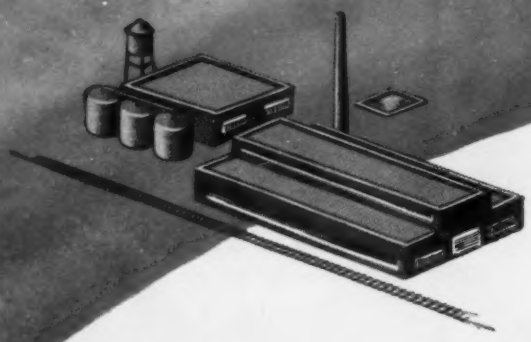
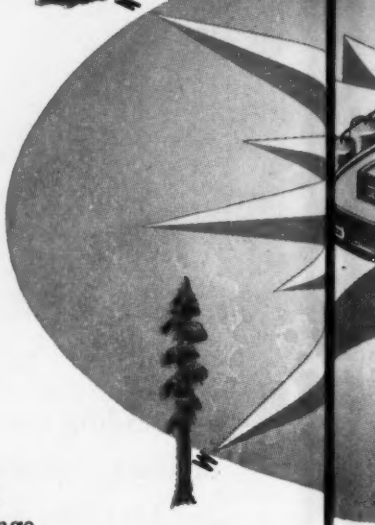
OUR PLANTS BLOOM THE YEAR 'ROUND



...so when it's Basic Chemicals for American Industry

call on GENERAL CHEMICAL first!



At every point of the compass . . . wherever Industry is centered . . . there is a General Chemical producing works or distributing station serving the territory. To supply Industry's requirements across the country, General Chemical has 33 major producing locations from which pour a steady stream of essential chemicals.

These include acids—alums—sodium compounds—fluorine derivatives —other heavy chemicals—as well as reagents, fine and pharmaceutic chemicals. Thus, coast to coast, a full flow of this broad and varied range of products, so necessary to peak production, is assured.

That is why . . . in every branch of Industry everywhere . . . the choice is General Chemical *first* in "Basic Chemicals for American Industry."

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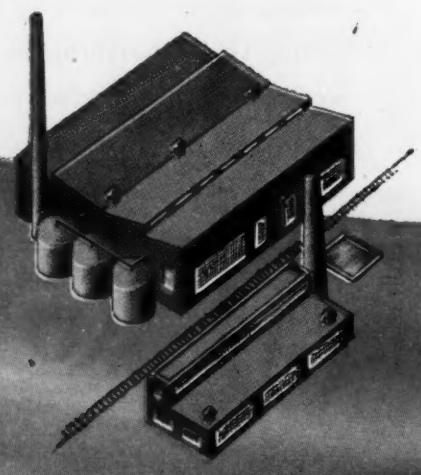
FOR AMERICAN INDUSTRY



...IN YOUR BACK YARD!

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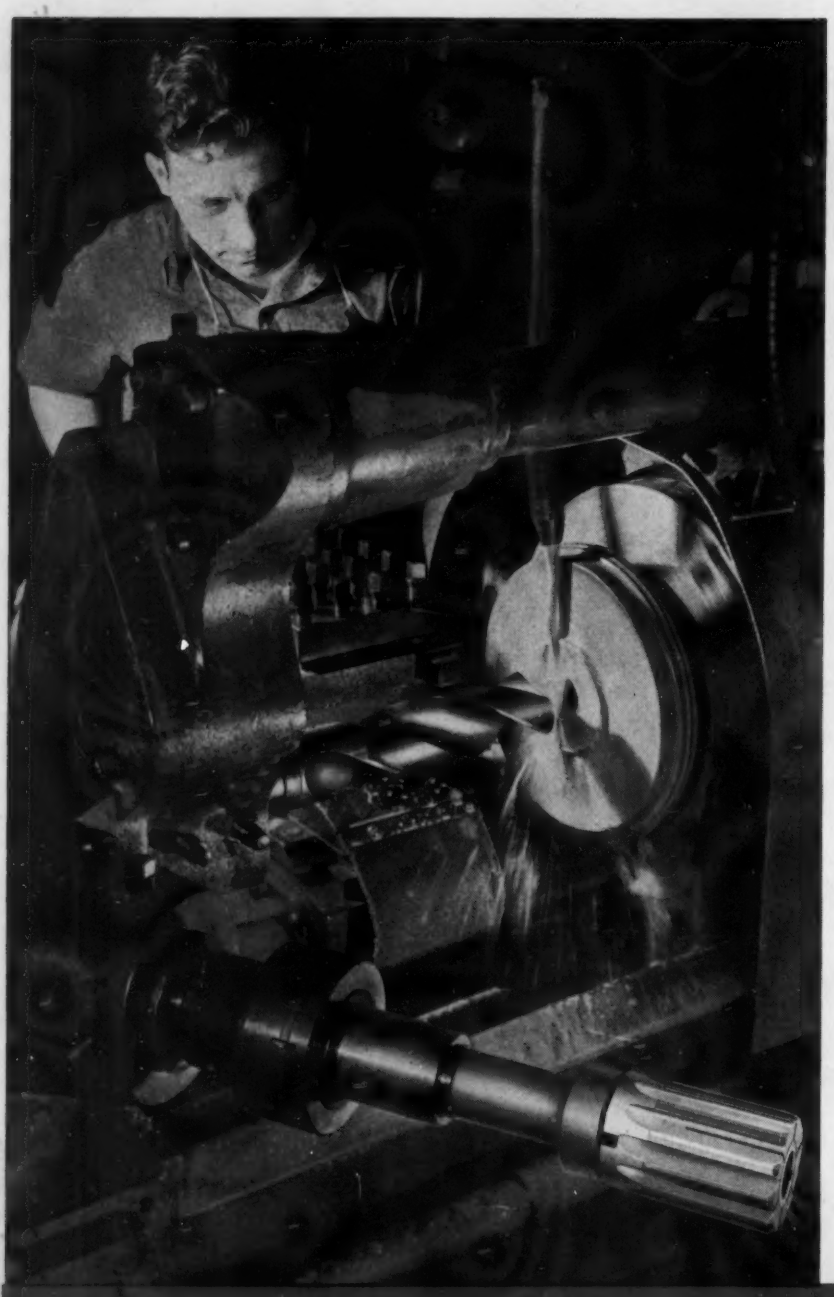
- Boston Works, Medford, Mass.
- Buffalo Works, Buffalo, N. Y.
- Calumet Works, Chicago (Hegewisch), Ill.
- Camden Works, Camden, N. J.
- Chillicothe Works, Chillicothe, Ohio
- Delaware Works, North Claymont, Del.
- Deming Works, Deming, N. M.
- Denver Works, Denver, Colo.
- Detroit Works, Detroit (River Rouge), Mich.
- East St. Louis Works, East St. Louis, Ill.
- El Segundo Works, Los Angeles (El Segundo), Calif.
- Front Royal Works, Front Royal, Va.
- Hudson River Works, Edgewater, N. J.
- Jacksonville Works, Jacksonville, Fla.
- Johnsonburg Works, Johnsonburg, Pa.
- Kalamazoo Works, Kalamazoo, Mich.
- Menasha Works*, Menasha, Wisc.
- Middletown Works, Middletown, Ohio
- Monroe Works, Monroe, La.
- National Works, Cleveland, Ohio
- Newell Works, Newell, Pa.
- New Orleans Works, Marrero, La.
- Pulaski Foundry, Pulaski, Va.
- Pulaski Works, Pulaski, Va.
- Richmond Works, San Francisco (Richmond), Calif.
- Savannah Works, Savannah, Ga.
- Vancouver Works, Vancouver, Wash.
- Wisconsin Rapids Works*, Wisconsin Rapids, Wisc.

*General Chemical Company, Inc.

A COMBINATION THAT'S *hard to beat!*

CLE-FORGE HIGH SPEED DRILLS *and* PEERLESS HIGH SPEED REAMERS



● Here's how to get both *speed* and *accuracy* . . . at the lowest possible cost. CLE-FORGE High Speed Drills have long been famous for fast cutting. PEERLESS High Speed Adjustable Reamers are widely known for dependable accuracy. Both will save you money because they produce *more holes per grind.* The same qualities are engineered into all other CLEVELAND Tools—Screw Extractors, Arbors, Mandrels, Sockets, Mills, Counterbores, and MO-MAX High Speed Ground Tool Bits and Cut-off Blades.

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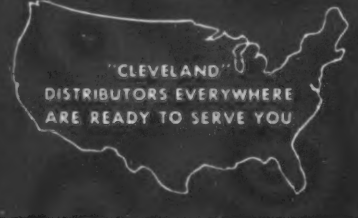
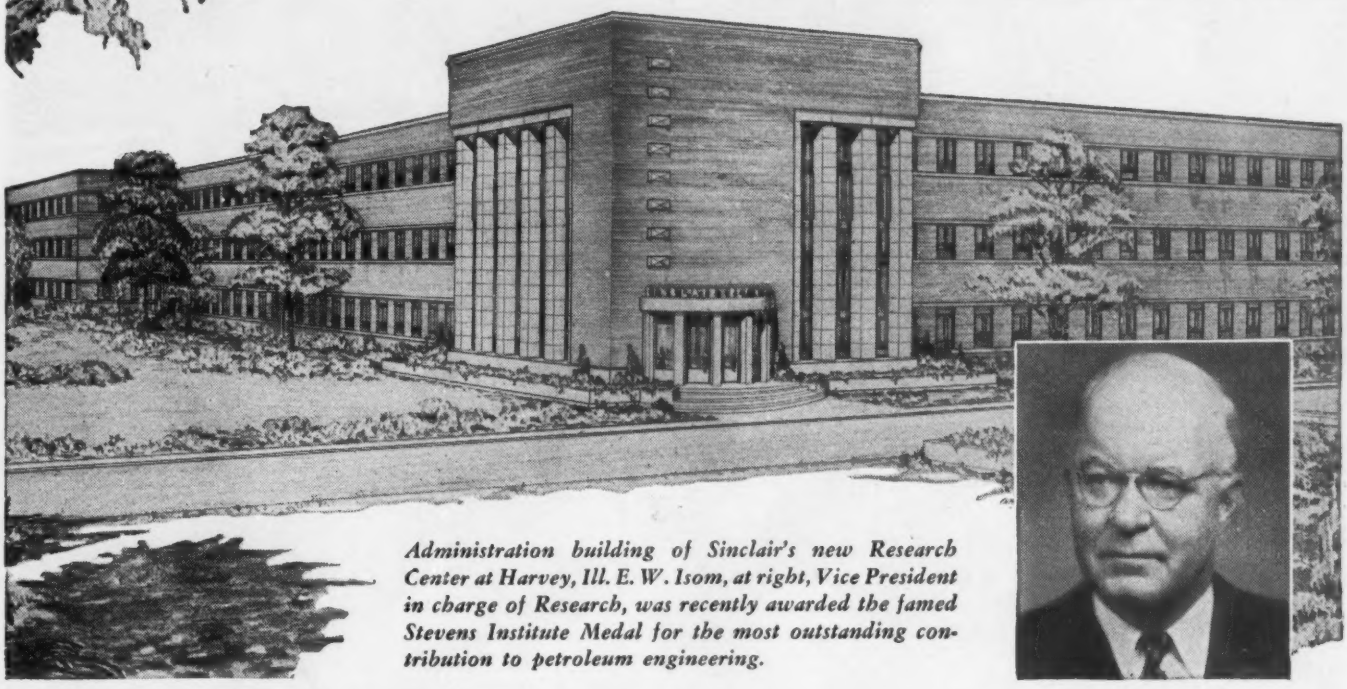


Outstanding Ability

. . . to solve your lubrication problems



Administration building of Sinclair's new Research Center at Harvey, Ill. E. W. Isom, at right, Vice President in charge of Research, was recently awarded the famed Stevens Institute Medal for the most outstanding contribution to petroleum engineering.

Sinclair is completing a new $4,000,000 petroleum research and development laboratory at Harvey, Ill. This great research center — to be the most modern and best equipped in the industry — climaxes more than 30 years of consistent achievement in the development of superior products for the solution of your most difficult lubrication problems.

The outstanding skill and vast technical knowledge of recognized experts in the petroleum field will continue to serve you at Harvey as they have for so many years at East Chicago.

For tested, proven lubricants . . . *designed by special research for specific industrial application* . . . rely on *Research-Wise Sinclair.*

Sinclair Metal Working Oils

For General Alloy Steels:
WILKUT OILS

For Tough Alloys:
AUTOKUT OILS

For Water Emulsions:
SATISOL and TOOLTEX

For Honing:
HONOL OILS

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Lubricants for Industry

FINEST CRUDES + EXPERT RESEARCH and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE

HARDENED AND GROUND FORGED STEEL ROLLS

Need rolls for your tin plate, strip or sheet mill . . . for rolling precious metals, copper, aluminum . . . synthetic materials? Look to Midvale if you want hardened and ground forged steel rolls built to your own high standard of quality. Midvale rolls are superior rolls—as your experience will prove. The reason—Midvale workmanship, care and knowledge, all contribute to the finished product.

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MIDVALE

Custom Steel Makers to Industry

STAINLESS AND TOOL STEEL BARS

•

CORROSION AND HEAT RESISTING CASTINGS

•

FORGINGS AND RINGS

IN WIND, RAIN, SNOW OR HAIL • YOUR FREIGHT GETS THERE BY RAIL!

Facts Favor Your Future in the "Union Pacific West"*

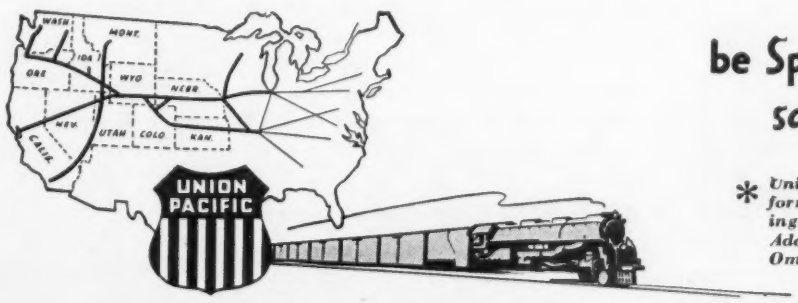
Of special interest to the Metal Industry

Fact 1. Since V-J day, hundreds of industrial and commercial concerns have located factories, warehouses and distribution facilities on the Union Pacific right-of-way in the western states served by the railroad.

Fact 2. This vast territory is rich in raw materials, natural resources, skilled and unskilled workers... with ideal living conditions, good schools, and plenty of space for future expansion.

Fact 3. Travel surveys show vacationists favor the western area by a wide margin. Result—greater interest in the West leading to permanent residence... growing markets, more manpower for industry.

Fact 4. Over its Strategic Middle Route, uniting the East with the West Coast, Union Pacific provides unexcelled rail transportation.



be Specific – say "Union Pacific"

* *Union Pacific will gladly furnish confidential information regarding available industrial sites having trackage facilities in the territory it serves. Address Industrial Dept., Union Pacific Railroad, Omaha 2, Nebraska.*

UNION PACIFIC RAILROAD

The Strategic Middle Route

You Better It by Battering It

Pangborn "Shot Peening" GIVES YOU YOUR CHOICE OF 5 WAYS TO IMPROVE PRODUCTION OR PERFORMANCE

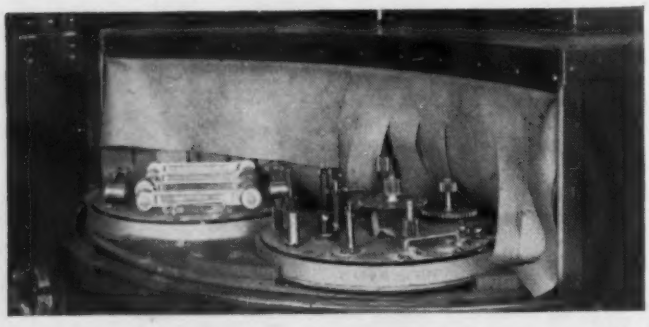
High-velocity hammering of metal surfaces with round shot ("peening") is a fast-growing method of increasing fatigue resistance. It puts the surface metal under residual compression and the metal beneath under tension; subsequent flexing merely *relieves* the compression and tension.

Resistance to deformation and fracture is increased often as much as 500%.

The benefits of shot peening can be put to any of the following advantages —

***1.** longer service life . . . **2.** higher stressing of parts . . . **3.** reduction in size and weight . . . **4.** use of less expensive materials . . . **5.** elimination or reduction in cost of subsequent operations.*

Pangborn Shot Peening equipment is being used for a great variety of work — from coil springs to crankshafts. A free booklet, "Shot Peening — What It Means to You", describes the application and gives performance data. Write to Pangborn, *world's largest manufacturer of blast cleaning and dust control equipment.* Pangborn Corporation, 1298 Pangborn Boulevard, Hagerstown, Maryland.



Pangborn Standard Shot Peening Table, front view. ROTOBLAST* Model impels shot by centrifugal force, AIR BLAST Model by compressed air.

*Trademark of the Pangborn Corporation

Pangborn

Pangborn Corporation, Hagerstown, Maryland

BLAST PEENS CHEAPER WITH THE RIGHT EQUIPMENT FOR EVERY JOB

the uniformity

of Accurate Springs

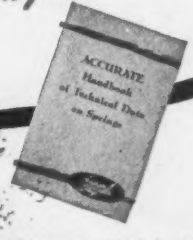
means lower ultimate cost FOR YOU!

Ordinarily you don't speak of the uniformity of a batch of springs in the same breath with cost. But the two are really inseparable . . . variations in the size and shape of springs can cause the loss of dollars worth of assembly time . . . variations in load characteristics can result in unsatisfactory operation of the finished product.

Here at Accurate you'll find skilled springmakers and practical, experienced engineers . . . people who realize the importance of uniformity to you. Why not make it a point to discuss your spring problems with us. **ACCURATE SPRING MFG. CO., 3823 W. Lake Street, Chicago 24, Illinois**

Load testing is one of several controls exercised at Accurate.

Springs *Accurate* Springs *Wire Forms • Stampings*



Send for your copy of the new Accurate Spring Handbook. It's full of data and formulae which you will find useful. No obligation of course.

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by Bridgeport Brass Co. "Bridgeport" BRASS CO. *Headquarters for BRASS, BRONZE and COPPER*

The Fight Against Corrosion

Copper-Base Alloys Resist Many Types of Corrosion

Corrosion is probably the most destructive element encountered since the dawn of civilization. In such industries as chemical processing, construction, transportation, electrical transmission, etc., it is frequently responsible for shutdowns of continuous operations.

Since corrosion or the disintegration of metals is generally associated with the presence of moisture, oxygen and various salts and gases, it is found everywhere. Engineers recognize the menace of corrosion and often try to retard its ill effects by increasing the factor of safety through the use of thicker cross-sections of materials. Protective coatings are also frequently applied. Obviously the most effective results can be obtained by specifying the more corrosion-resisting metals. This may add somewhat to the initial cost of the installation but will more than pay for itself through lower maintenance, fewer replacements, and less frequent interruptions in service.

Fortunately much has been done in recent years on corrosion research which is bringing substantial benefits in increased service life and greater safety. Experience has shown that copper-base alloys are among the most corrosion-resistant metals for many applications.

Offsetting Corrosion from Weathering

We are all familiar with the destructive power of the elements—rain, snow, frost, dew, sunlight, etc. Metals or alloys which have an almost unlimited life indoors or in a dry climate, may fail in a few short years when exposed to dampness and weather.

A common experience is the rusting of steel and iron which gradually thins the article until it eventually becomes destroyed. The same item made from brass or copper, when used under the same conditions, is not destroyed like iron or steel. Unlike rust, the products of corrosion form a protective film or patina which retards further corrosive attack. Stressed yellow brass, however, is subject to season cracking when stamped or spun parts have not been relief-annealed before being exposed to corrosion involving ammonia.

Ammonia is a gas which is developed from the decomposition of animal and vegetable products which contain nitrogen compounds. Another common source results from the combustion of coal. Ammonia is therefore a common gas although it is generally found only in very minute quantities in the atmosphere. Since ammonia is very soluble in water a dilute ammonia solution is sometimes found on the surface of metals as a result of condensation of moisture in the atmosphere. Experience has shown that copper and certain high copper alloys are practically immune to season cracking.

From the above it is evident that articles of dependability for outdoor use such as bolts, nuts, and screws for hanging signs or for attaching skylight frames; weather stripping, pole line hardware, wire and cable connectors, nails, and other fastenings should be made from copper alloys such as the Duronze* silicon bronzes which are resistant to destruction from corrosion and weathering. Porch lights, flashing or other metal parts exposed to the weather should be made from copper or brass containing more than 85% copper.

Offsetting Corrosion From Water

The destructiveness of water is known to all. Waters vary considerably in their corrosive action on different materials. This is due to the effect of certain salts and gases which are dissolved in it. Many other factors such as concentration, temperature, velocity, etc., influence the corrosion rate.

For fresh water, red brass and copper are successfully used for piping, heat exchangers, evaporators, condensers and coolers, valves, storage equipment, filters, fasteners, radiators, etc.

For sea water, red brass and copper are also satisfactory for many applications. However, these alloys are sensitive to rapidly moving sea water. Under such conditions, alloys such as Admiralty, Cuzinal (aluminum brass), Duronze IV** (arsenical aluminum bronze) and Cupro Nickel are widely used as condenser tubes and heat exchanger tubes in surface condensers, heat exchangers, refrigerating equipment and pipe lines.

For Industrial Applications

Wherever possible, oil, sugar and salt refining, paper and pulp manufacture, chemical processing, and, in fact, practically all industrial activities are designed to operate on a continuous or semi-continuous basis. Any breakdown, no matter how insignificant, may lead to serious interruption of production. It is therefore good engineering sense to use dependable materials throughout that stand up without deteriorating prematurely.

Copper and its alloys in the form of sheet, rod and tubing have long been used in the construction of equipment such as absorption columns, agitators, autoclaves, bubble caps and trays, condensers, heat exchangers and evaporators, digestors and pipe lines and valves for conveying gases, steam, water, fuels and liquid products; kettles, pans, pump parts, valves, retorts, stills, tanks, tie rods.

In the last decade much progress has been made in the development of copper-base engineering alloys. Contact our nearest branch office to help you on your corrosion problems. The services of our laboratory are available to help you extend the life of your equipment and for specifying longer lasting alloys for new equipment.

*Reg. U. S. Pat. Office **U. S. Pat. No. 2,093,380

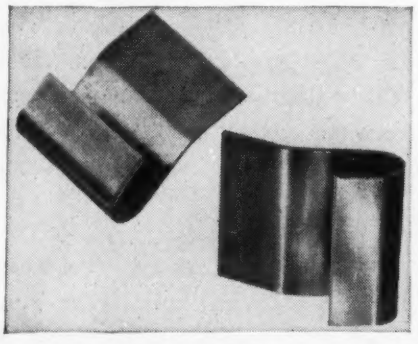
Corrosion takes an unnecessarily heavy toll in industry.

PHOSPHOR BRONZE WITHSTANDS HARD USAGE IN OVEN DOOR CATCHES

The combination of excellent corrosion resistance, unusual resilience under repeated flexing stresses, and low friction coefficient when used in sliding contact with other metals makes Bridgeport's Improved Phosphor Bronze an ideal material for oven door spring clips. In addition, the ease with which it can be formed is important from the standpoint of economy in the fabrication of the catches illustrated, which are made by the California Spring Company of Los Angeles.

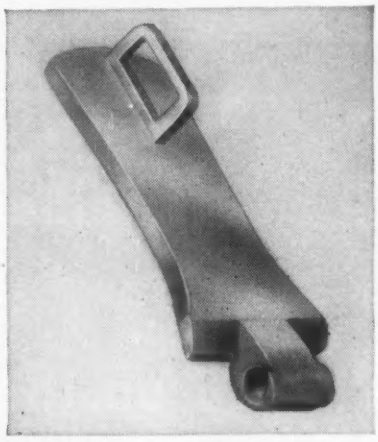
These catches must withstand the corrosive attack of moist cooking vapors, which make short work of rustable materials. Not only does phosphor bronze resist such vapors, but it shows very little wear after repeated rubbing and abrasion encountered in opening and closing oven doors. Since larger deflections than usual are encountered in this application, the necessary rigidity and strength are secured by using a fairly thick section of metal.

Better processing methods and equipment had been used for this alloy, resulting in the consistent improvement of its properties. Bridgeport Phosphor Bronze has been helpful in the development of more dependable mechanical and electrical spring applications. The more generous use of Bridgeport's Improved Phosphor Bronze and other modern engineering alloys is more than repaid in better service, reduced maintenance and longer life.



Oven door catches made of Bridgeport's Improved Phosphor Bronze resist corrosion from cooking vapors, remain resilient after repeated flexing and remarkably free from wear and abrasion.

COLD FORGING IMPROVES STRENGTH OF HINGE LOCKS



Illustrated above is a hinge lock made by the ingenious method of cold forging. A one-piece job has resulted which requires no soldering or riveting. Credit for this goes to Milwaukee Stamping Company.

When high scrap losses are pushing up the cost of parts requiring many operations, often production costs can be reduced and materials can be saved by resorting to cold forging. Not only is it possible to reduce the number of rejects, but the quality and strength of the product can be greatly improved.

Naturally, successful cold forging depends upon many related factors—tool design, layout of operations and selection of materials. For such operations, a strong but highly ductile material is required. In addition to possessing the required physical properties, the metal must also be free from surface imperfections, blisters, scratches and folds. The natural beauty of brass adds to the quality of the product, which is never weakened by rust or wear.

Many large items are today being made by cold forging, owing largely to the development of more powerful cold heading machines and the availability of a wide range of high-strength engineering alloys especially adapted to cold working. Bridgeport's Duronze alloys, for instance, can be used in making bolts and fastenings having tensile strengths above 100,000 psi, and possessing unusual corrosion, wear resistance and toughness.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Thickness Gage employing supersonics is said to be capable of measuring thicknesses of metals and detecting flaws where only one surface is accessible. Direct reading of tubing and flat parts between .005 and .300 is claimed, with indirect reading of thicknesses up to 4 inches possible with slight calculation. **No. 808**

Gear Generating Machine handles sizes from smallest practical diameter up to 3 in. in 30 to 200-inch pitch range. It is reported to be especially designed for production of gears used in instruments, fractional hp drives, cameras, watches and similar equipment. Generates any tooth forms produced by conventional methods. **No. 809**

Precision Boring of holes having length-to-diameter ratio of 8 to 1 is said to be facilitated by unusually rigid carbide boring bars. Suitable for steel, cast iron, bronzes, brasses and aluminum, one bar is furnished in ¼ to ⅜" boring diameter by 3½" long, another with steel insert in seven sizes for boring diameters ranging from ¼ to 1". **No. 810**

Continuous Brazing, soldering and annealing of parts is effected by new turntable employing non-metallic circular plate and ring of work-holding cups on induction heating machine. Operates on 115-volt 60-cycle a.c. and can be varied in speed from ½ to 3 rpm. **No. 811**

Electronic Protective Device is said to protect against mechanical overload due to dull tools, oversize stock, pileup on conveyor, etc., by detecting resulting increase over a predetermined current input. Device acts to shut down motor and sound a warning. **No. 812**

REPRINTS AVAILABLE

If you are interested in keeping an up-to-date file on the Copper Alloy Bulletin, we shall be glad to put your name on our mailing list to receive reprints regularly. Most of the back issues are also available on request. Comments from our readers are always welcome since we are grateful for any suggestions regarding the discussion of subjects dealing with copper-base alloys and their fabrication.

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL

Warehouse Service with Slitting Facilities in Principal Cities

STRIP AND SHEET—For drawing, stamping, forming, spinning. Leaded alloys for machining, drilling, tapping. Silicon bronze, phosphor bronze for corrosion resistance. Alloys suitable for springs. Engravers' copper and brass.
WIRE—Cold Heading alloys for screws, bolts, nuts, nails, fastenings, electrical connectors, Phono-Electric trolley and contact wires.

ROD—Alloys for screw machine operation. Duronze III high strength, corrosion-resistant, good for machining and hot forging. Hot forging and cold heading alloys. Welding Rods. Copper-covered ground rod.

TUBING—For miscellaneous fabrication. For condensers and heat exchangers. For water, air, oil and hydraulic lines.

DUPLEX TUBING—for conditions too severe for a single metal or alloy.

PIPE—Brass and copper for plumbing.

FABRICATED GOODS—Plumbing brass goods. Radiator air valves. Aer-a-sol insecticide dispensers. Automobile tire valves.

TECHNICAL SERVICE—Staff of experienced, laboratory-trained men available to help customers with their metal problems.

WAREHOUSE SERVICE—Warehouse and jobbers stocks available for prompt delivery in principal cities.

TECHNICAL LITERATURE—Manuals and handbooks available for most products.

"Bridgeport" BRASS CO.

BRIDGEPORT BRASS

BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865

Mills at Bridgeport, Connecticut, and Indianapolis, Indiana • In Canada: Noranda Copper and Brass Limited, Montreal

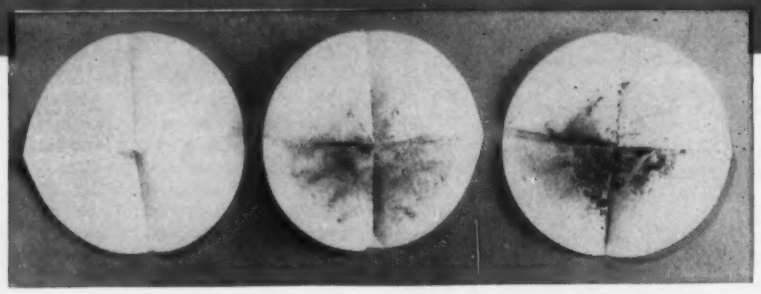
Advertisement

HERE'S PROOF THAT HOUGHTON'S ANTISEP SOLUBLE OIL

1. Settles out faster in reservoir . . .

2. Carries less contaminants in solution . . . and

3. Won't load up the grinding wheel



Left—After filtering Antisep Soluble Oil. *Center*—Coolant No. 2 carries more contaminants in solution. *Right*—Coolant No. 3 has greatest contaminants to load up wheel.

Here's a plant test that proves what we've continuously claimed for Antisep Soluble Oil. The plant was finish-grinding crankshafts, and was using three different coolants on identical machines.

We took samples of each coolant from the nozzle where it came out on the wheels, and after shaking well, filtered 200 cc. of each. The filter papers were weighed before and after, with these results:

Antisep —1.9 grams of contaminants removed.

Coolant #2—2.18 grams removed.

Coolant #3—2.4 grams removed.

The contaminant was analyzed and found to contain 86% iron, 1.1% carbon, .37% silicon, 4% aluminum and the balance, binder from the wheel. The first two coolants were diluted 100 to 1 with water. No. 3 was a 40-1 dilution.

The results are summarized above. They point to Antisep as the answer to your grinding coolant question, because it settles contaminants out rather than carry them in solution. That means finer finishing of surfaces, and no loading up of the grinding wheel.

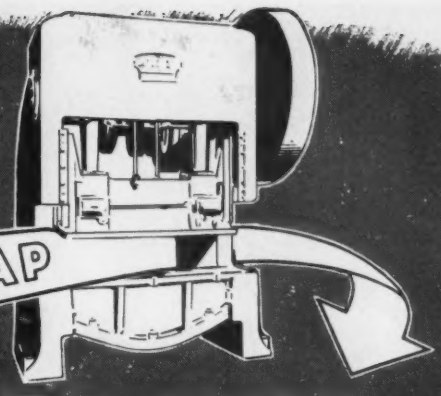
Antisep costs less, prevents rancid odor, is kind to operators' hands, is usable for longer periods. When you are ready to try Antisep, we'll be ready too.

E. F. HOUGHTON & CO.

303 W. Lehigh Ave., Philadelphia 33, Pa.

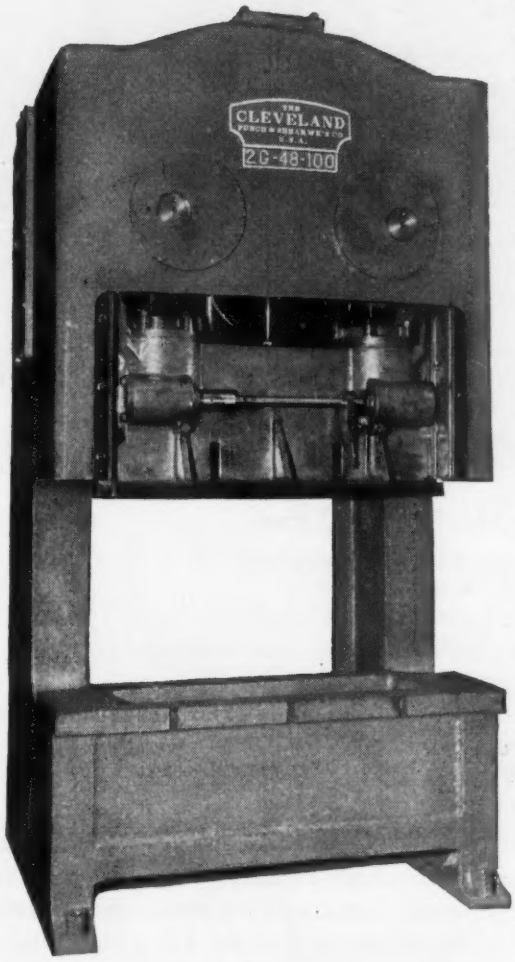
Service and Sales Offices in All Principal Cities

CLEVELAND OPEN BACK GAP PRESSES

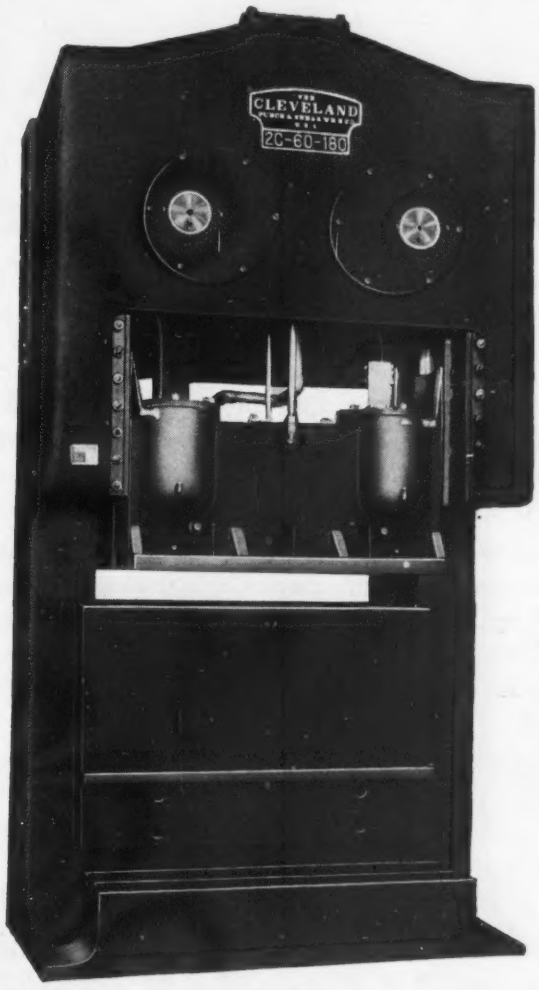


This line of Cleveland Open Back Gap Presses combines the Modern stream line design, which not only assures more efficient operation and longer life but also reduces floor space to a minimum, with the overhanging gap and open back features which afford greater convenience in the handling of large or irregular sheets and for feeding material right and left across the dies.

Built in a wide range of sizes and capacities, these presses can be furnished with standard bed, or with the bed cut back to accommodate various tables, as shown by the illustrations. This is but one of the fourteen different types of Mechanical Power Presses built by Cleveland for efficiency of operation and economy in the production of Pressed Metal parts.



Cleveland Two Point Gap Press, Twin Drive, equipped with Air Friction Clutch, air counterbalance to slide, stroke 8", adjustment 4", shut height 24", R.P.M. 35, capacity 100 tons.



Cleveland Two Point Gap Press, flush front equipped with air friction clutch and separate air brake on flywheel. Stroke 12"—Adjustment 4", Shut Height 54", R.P.M. 35, Capacity 180 tons.

CLEVELAND

THE CLEVELAND PUNCH & SHEAR WORKS CO.

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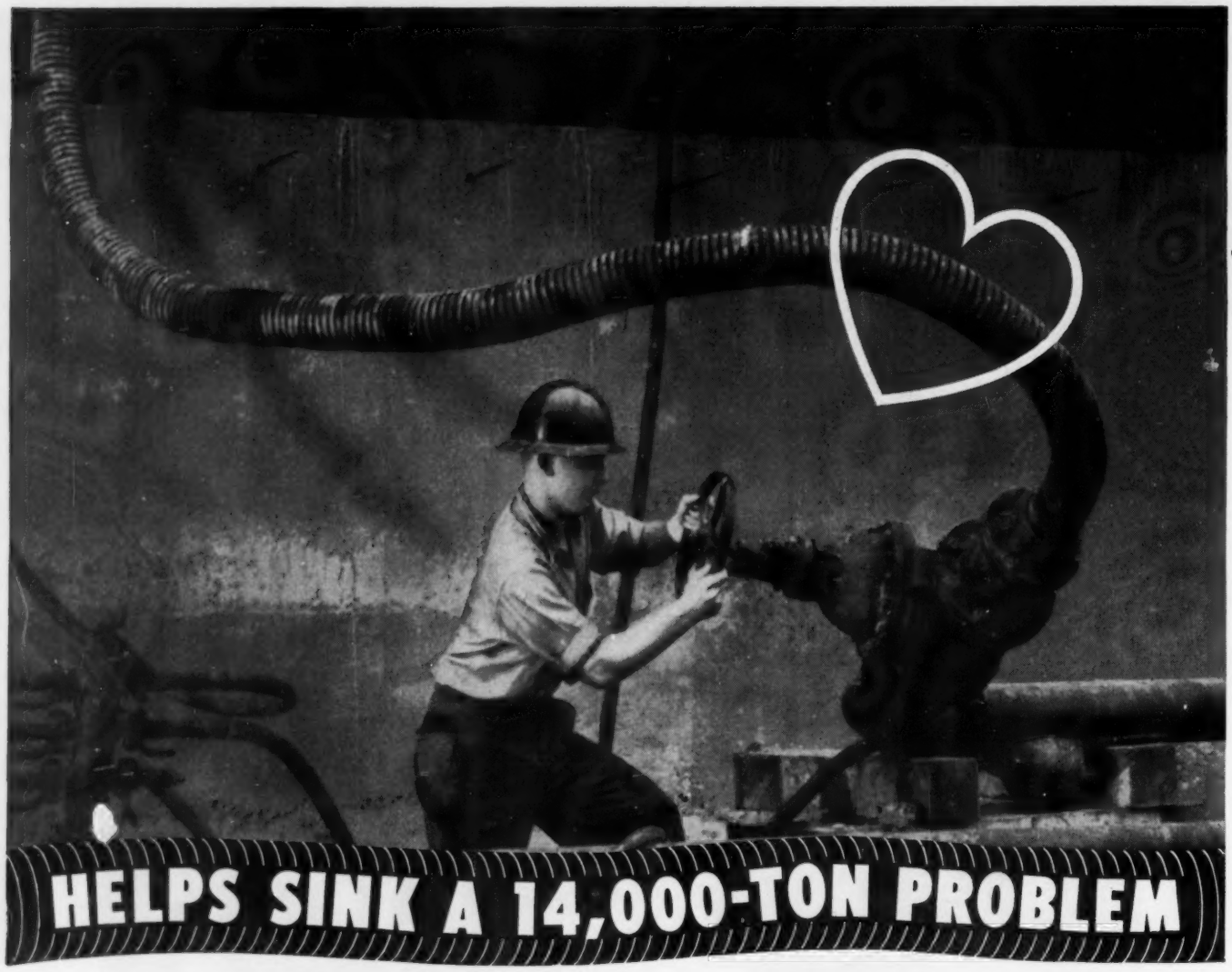

HELPS SINK A 14,000-TON PROBLEM

Penflex flexible metal hose provides efficient, time-saving service as jet feeder lines on tunnel project

Sinking a 14,000-ton caisson 70 ft. into a sand island is a tough nut to crack. One of the problems confronting engineers was the need for flexible jet feeder lines, to transmit water at high pressure up over the top and down to the jets at the bottom of the caisson.

These jets force away sand on which the caisson rests, allowing it to settle gradually as the top sections are built up. This constant changing of the top level made flexiblity a "must" for jet feeder lines—but with Penflex "Flexineering" on the job, the problem vanished.

Penflex engineers recommended the installation of 4" interlocked flexible metal hose, thus eliminating the need for connecting and disconnecting rigid pipes, saving time and labor. Penflex hose is plenty flexible . . . resists high pressure . . . assures tight, free-flowing service.

When flexible tubing problems bog down efficiency and production in your plant . . . when you need flexible, leak-proof transmission of liquids, air, gas, or light solids, consult Penflex for "Flexineering" service (the science of engineering each type of flexible tubing to the problem). And for a complete line of flexible metal hose, tubing, and couplings from ⅛" I. D. to 30" for all purposes, write today to . . .

PENFLEX SALES COMPANY

Division of

PENNSYLVANIA FLEXIBLE METALLIC TUBING COMPANY

7219 Powers Lane **Philadelphia 42, Pa.**

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Penflex... HEART OF INDUSTRY'S LIFE LINES

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"IT WOULDN'T PAY US TO MISLEAD YOU!"

SPEED CASE STEEL x1515

LOW CARBON OPEN HEARTH FOR CARBURIZING

IS NOW PROFITABLY SERVING OVER 300 OF OUR CUSTOMERS. It will do the same for YOU.

We told them the facts about *Speed Case Steel.*
We sent samples and a Production Expert to show them how to use *Speed Case* in their own plants.

IN EVERY INSTANCE SPEED CASE STEEL...

SPEED TREAT STEEL
Medium High Carbon for Heat Treating

Increased Production . . . Lowered Costs . . . Minimized Rejections . . . Improved Product . . . Replaced Multiple Stocks B1112, C1113, C1117, C1118, C1016, C1017, C1018 and C1019 . . . Why not test *SPEED CASE* in your plant?

DO THIS AT OUR EXPENSE... Write us for samples of Speed Treat and Speed Case Steel. Our Production Expert will follow them to your plant and make his demonstration. Investigate SPEED CASE . . . you can't lose!

Tear off here ATTACH TO YOUR LETTERHEAD AND MAIL TO EITHER COMPANY BELOW

Licensor
MONARCH STEEL COMPANY
HAMMOND · INDIANAPOLIS · CHICAGO
PECKOVER'S LTD., Toronto, Canadian Distributor

MANUFACTURERS OF A COMPLETE LINE OF COLD FINISHED CARBON AND ALLOY STEEL BARS

Licensee for Eastern States
The FITZSIMONS STEEL COMPANY
YOUNGSTOWN, OHIO

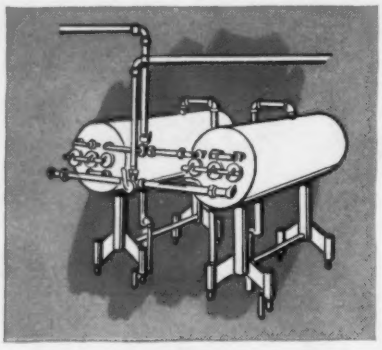
ACTUAL PHOTOGRAPH
Speed Case Steel (.20 carbon) 1 inch cold drawn bar tied in a knot, cold, without fracture.

"Standard" EXCELS IN SOLVING TOUGHEST STAINLESS TUBING PROBLEMS

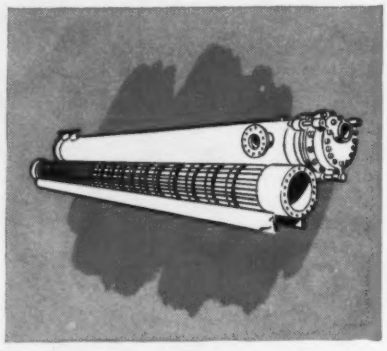
Bring us yours

Never in 25 years has the demand for "Standard" welded steel tubing and "Standard's" unsurpassed services in licking toughest tubing problems been so great. Whether yours is a problem of fabricating—(bending, flaring, flanging, swaging, upsetting or welding)—or of selecting analyses or tolerances, "Standard" is ready to consult and assist you.

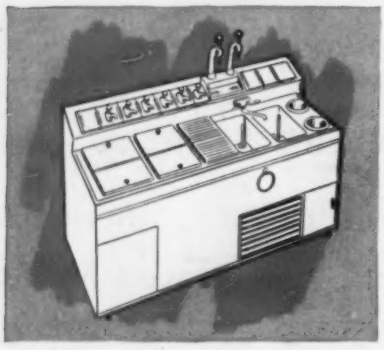
IF YOU HAVE A PROBLEM in Stainless tubing for use in bus, trolley or railroad car, consult with "Standard" experts in tubing "know-how."



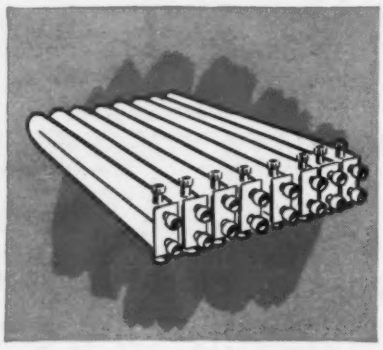
IF YOU HAVE A PROBLEM in Stainless tubing for dairy processing equipment, "Standard" can tell you the best solution for best results.



IF YOU HAVE A PROBLEM in Stainless tubing for heat exchangers in chemical and other process plants, call on "Standard" to help you.



IF YOU HAVE A PROBLEM in Stainless tubing for use in soda fountain and beverage dispensing units, let us work out the best answer.



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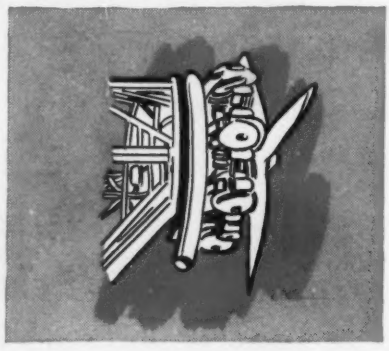

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5/8"	.049"	18	.028"	22
3/4"	.049"	18	.028"	22
7/8"	.065"	16	.028"	22
1"	.083"	14	.028"	22
1 1/8"	.083"	14	.028"	22
1 1/4"	.083"	14	.028"	22
1 3/8"	.083"	14	.028"	22
1 1/2"	.095"	13	.028"	22
1 5/8"	.095"	13	.035"	20
1 3/4"	.095"	13	.035"	20
1 7/8"	.095"	13	.035"	20
2"	.095"	13	.035"	20
2 1/4"	.095"	13	.035"	20
2 1/2"	.095"	13	.035"	20
2 3/4"	.095"	13	.035"	20
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The Magazine of Metalworking and Metalproducing

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a *New* approach to the problem of MATERIAL HANDLING

L. C. BACKART

Since the advent of the machine age, whenever greater production has been needed, industry has turned-on her inventive powers and new higher-speed machinery has been developed. It is this creative ability that has provided balance for our democratic way of life . . . keeping production high and costs low.

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December 1, 1947

Mr. White Explains

Those hundreds of metal stampers, warehousemen, jobbers, purchasing agents and others who packed the ballroom of Hotel Cleveland last Monday evening to attend the meeting of the Cleveland District of the Pressed Metal Institute heard an exposition of the tight situation in steel supply that has been long overdue.

For months Tom L. Smith Jr., president of the institute, has been a provocative critic of the steel industry. He has charged that the gray market has assumed serious proportions, that steel producers have been too complacent regarding it, that steel companies favor their fabricating subsidiaries at the expense of independent fabricators, that distant customers of steel producers have been cut off unceremoniously and that the basic steel industry is guilty of other sins, including the cardinal one of shirking its responsibility for increasing capacity substantially now.

Several times the Pressed Metal Institute has invited steel executives to appear at institute meetings to refute these charges. Until last Monday evening, with one exception, steel producers had not accepted these invitations.

At the Cleveland meeting Charles M. White, president of Republic Steel Corp., third largest steel producer in the nation, answered critics frankly and bluntly. He presented cold figures to indicate that the charge that 2 million tons of flat-rolled steel is sold in the gray market is fantastic. He related Republic's policy toward customers. He declared Republic's fabricating divisions in 1947 are receiving 6.8 per cent of Republic's steel as compared with 8.7 per cent in the 1939-1940 base period. He explained why and how Republic is withdrawing from distant markets. He went into the problem of expansion in detail. In short, he had an answer for every important criticism.

In our view, the significance of this meeting is not in the merit of Mr. White's answers as much as it is in the fact that he actually appeared to answer the critics. For some unaccountable reason the steel industry has been lamentably negligent in putting its best foot forward in the present crisis. It has a good case. The sooner other top steel executives take the trouble to explain, as Mr. White has done, the sooner seller-customer relations in the metalworking industries will take a turn for the better.

* * *

1948 UNION DEMANDS: While most of the union contracts in the metalworking industries do not expire until in the second quarter of next year, it is not too early to anticipate what unions will demand when negotiations are reopened.

Present indications are that the unions will base demands upon the continued rise in the cost of living and the ability of industry to pay, which is assumed because of the high dollar profits reported by most companies in 1947. There is also reason for belief that some unions will press hard for welfare provisions, such as pensions, broadened insurance coverage and wage guarantees.

The cost of living argument is not convincing when it applies to employees whose wages have increased more than the cost of living. The ability to pay argument should take into account the realistic financial condition of companies, including the need of capital for plant and equipment. What can be done in welfare provisions depends upon a host of tangible and intangible factors.

However, whatever demands are put forth should be considered in the light of what the

(OVER)

AS THE EDITOR VIEWS THE NEWS

unions can promise in return. It is time for labor to strive harder for productivity, more regular attendance and fewer unwarranted work stoppages. The economy cannot long support a system that calls repeatedly for more pay for poorer individual performance. —p. 59

* * *

FREIGHT CAR HEADACHE: Railroad freight car production continues to be one of the nation's most difficult problems. Some time ago plans were made for insuring an output of 10,000 cars per month during the latter part of 1947. Output was 8364 cars in October and an estimated 9000 cars in November.

Failure to meet past goals has been attributed to three factors—not enough steel, unbalanced inventories and shortage of skilled labor. The Office of Defense Transportation, after conferring with steel producers, envisions enough steel to permit an early improvement in car repairs and a gradual increase in production of new cars.

The latest target is an output of 15,000 cars a month by next July. ODT Director Johnson says increased steel supply may permit builders and shops to make a gross monthly addition of 14,000 cars in January, none of which would be tagged for export. —p. 65

* * *

MORE TRUCKS, BUSSES: Automobile output during the past two months has been unusual in several respects. For one thing, assemblies at the recent rate of 22,000 units daily is a remarkable achievement in view of existing conditions. Also noteworthy is the fact that of total production, about 25 per cent consists of trucks and commercial cars.

Today's pace of assembly of these commercial units exceeds anything witnessed in the industry in the past. It is estimated that the output of trucks and motor coaches in 1947 may total 1,400,000 units. Heretofore, a million-truck year was considered almost the millennium.

An important factor in this showing is the increase in the output of transit busses and motor coaches, which has moved ahead even faster than that of trucks. The entire record reflects the tremendous nation-wide pressure for improving run-down and inadequate passenger and freight highway transportation service. —p. 75

SIGNS OF THE TIMES: Your company probably is one of the 250,000 firms which in January will receive one or more of the 200 forms to be sent out by the Bureau of Census. Replies are particularly important because this will be the first census of manufactures (p. 68), undertaken by the government since 1939. . . . War Assets Administration, moving toward complete liquidation next June 30, has reduced personnel from a peak of 58,800 in 1946 (p. 70) to 34,600 at the present time. . . . Complete plans have been formulated for electrifying Belgian railroads. The program, which is expected to save 650,000 tons of coal and about $10 million in operating costs annually (p. 72) will cost $363,636,363. . . . Some years ago, designers of mill motor rooms hit upon the idea of maintaining an air pressure in the room slightly above atmospheric pressure so that dust could not enter. Today the idea, with refinements (p. 90), is being adopted in plants where the assembly of small parts requires freedom from dust. The refinements involve heating and conditioning of the dust-free air. . . . Apparently this is the open-season for postwar production records. In the week ended Nov. 22 production of passenger automobiles and trucks in the United States and Canada totaled 118,228 units (p. 80), a new postwar high achieved in spite of an abnormally high rate of absenteeism due to the proclivity of employees to take advantage of the hunting season. . . . A Department of Commerce report states that fabrication of finished abrasives in Germany has developed little if at all beyond the state of the American industry 15 or 20 years ago. However, the report (p. 128) concludes that although American abrasives are superior to German, "the high cost of labor in the United States will make it difficult to compete with the German product in the world market". . . . Alexander G. Bryant, incoming president of the National Machine Tool Builders' Association, has made a personal appraisal of the quality of machine tools shown at the recent 1947 Machine Tool Show. He concludes that the increase in efficiency of show models over pre-show models (p. 91) ranges all the way from 10 to 500 per cent, the average being about 33⅓ per cent.

E. L. Shaner

EDITOR-IN-CHIEF

IT takes more than modern scientific methods to make quality steel. It takes men . . . good men . . . to make good steel. The knowledge, experience, and judgment of every steelmaker . . . from supervisor to men on the floor . . . determines the quality of a steel. Inland men take a personal pride in their skill. They blend a part of themselves into every ton of steel they turn out. And the steel they produce is steel they are proud of . . . steel you can use with confidence.

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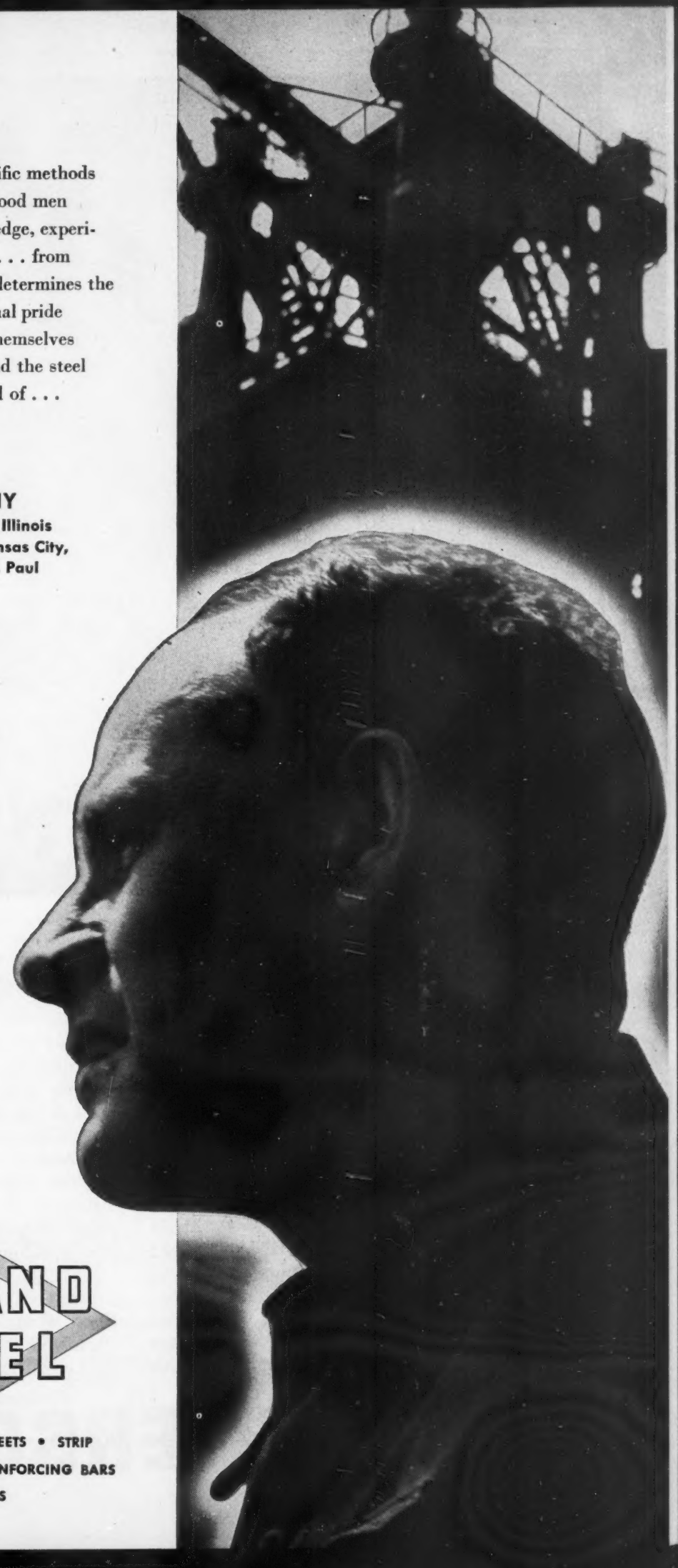

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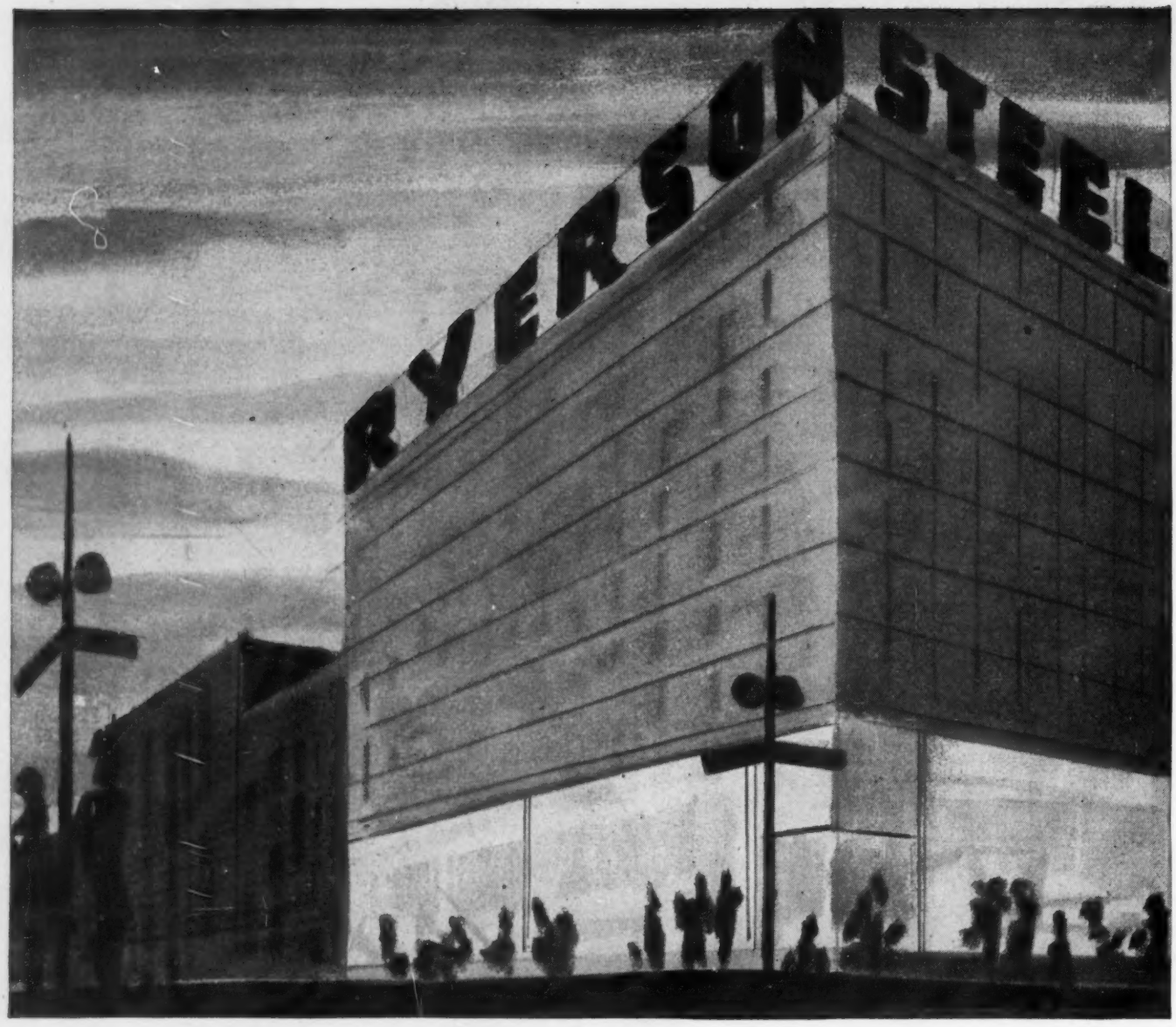

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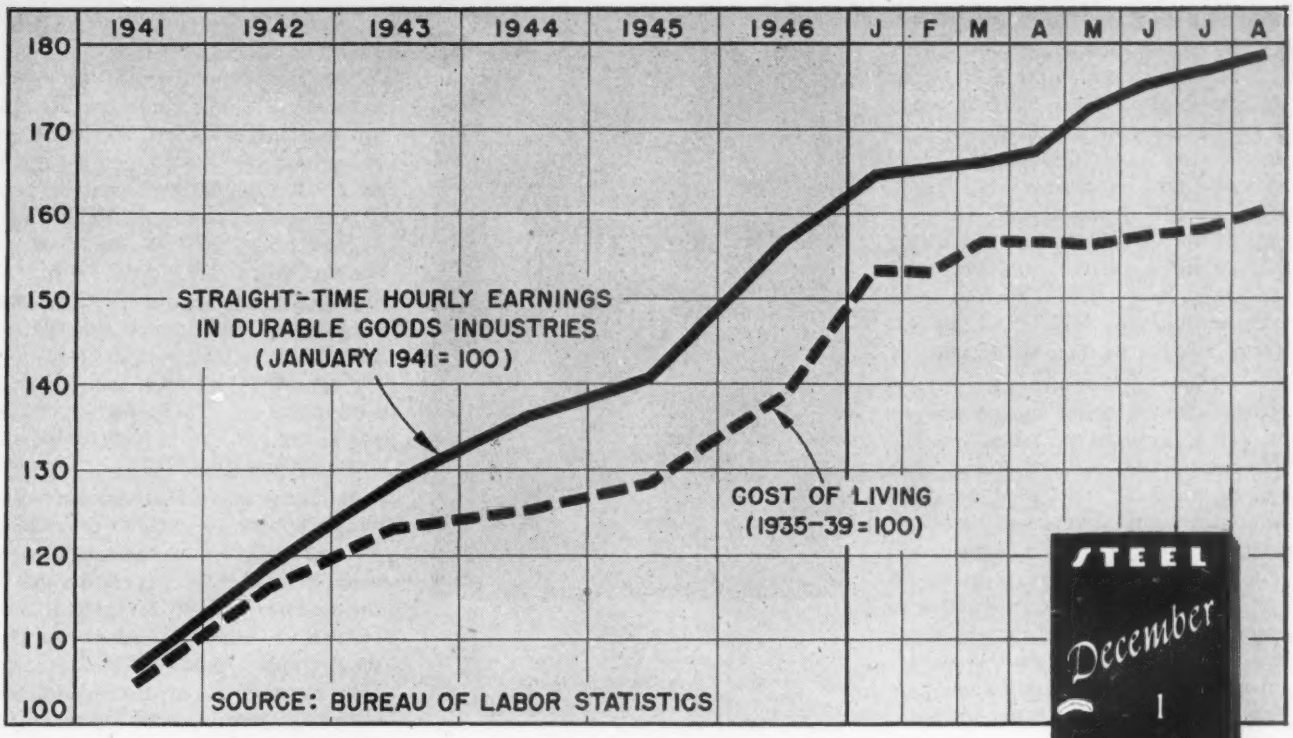


Although the cost of living, as measured by the Bureau of Labor Statistics index of consumers prices, has advanced sharply in recent months, wages of workers making durable goods have increased even more. Chart above indicates the advantage the workers enjoy over prewar rates

Third Round Wage Demands Coming

Metalworking industries to face issue early next year. Unions base demands on increase in living costs and corporate ability to pay. "Real" wages still ahead of prewar

DEMANDS for the third round of postwar wage increases are being readied in union headquarters throughout the country and will be presented to the metalworking industries as present contracts near expiration dates.

Union negotiators will base the demands on two primary factors: (1) Continued rise in the cost of living; and (2) ability of industry to pay, based on high dollar profits reported by most companies this year.

Welfare Year—In addition to wage demands, the unions will ask for numerous welfare provisions. Pensions, broadened insurance coverage, wage guarantees will figure prominently in the campaign. Extent to which the unions will insist on broadened welfare concessions will depend on the progress of wage negotiations and settlements will vary considerably from industry to industry. However, it is considered likely that many employers' disbursements for "invisible wages" will be greater in 1948 than in 1947.

Cost of Living—Main talking point of the unions will be the increase in the cost of living since the present wage agreements were signed. To an extent this will be a valid argument, although the unions may be expected to bring out some distorted figures on the amount of the advance.

Actually the cost of living has advanced about 7½ points on the Bureau of Labor Statistics index since last March and April when most of the current wage agreements were signed. This amounts to less than 6 per cent increase from the signing of the contracts to the middle of September, latest for which cost of living figures are available.

However, the union leaders argue that further increases are in prospect and are anxious to gain new wage increases as insurance against continuing inflation, considered inevitable in view of the European aid program.

Wages Still Ahead — Industrial workers are still well ahead in the wages and price race. Today's pay envelopes still buy considerably more than they did in 1939, despite the rise in prices. While the cost of living has increased about 61 per cent since 1939, average hourly earnings of steel workers, for example, have advanced nearly 87 per cent. Also, a longer work-week raises the total weekly pay to give the wage earner a further advantage.

Ewan Clague, commissioner of the Bureau of Labor Statistics, has compiled a mass of figures to show the gain in purchasing power of today's wages over those of 1939. He has taken the gross weekly wages in 1939 and in September, 1947, deducted income tax requirements (few workers paid income tax in 1939, but most do now), and adjusted the take-home pay to living costs to determine the "real" wage. His figures show that in all the occupations on which the BLS keeps tab today's "real" wages are higher.

Manufacturing workers, for example, drew on the average a gross wage of $23.86 in 1939, against $53.96 last September. Allowing for taxes and increased costs of living, this results in a "real" wage of $23.67 in 1939 and $32.45 last September. In other words, the industrial worker is receiving about $9 more a week in terms of the 1939 dollar.

The advantage varies among the

various occupational groups, with John L. Lewis' coal miners enjoying the largest gain. From a gross wage of $23.88 in 1939 to $71.19 in September, the coal miners are now enjoying an advantage in "real" wages of $19 a week over 1939.

How Much?—While no responsible union leaders in the metalworking industries have yet indicated how large an increase will be demanded, a few straws in the wind can be discerned.

One formula being considered by some CIO leaders is based on the increase in the cost of living plus a dime an hour for good measure and bargaining purposes. On this basis, the union would figure out how large an increase was necessary to offset the increase in consumer prices since the current wage agreement was signed—say, 8 cents—and add a dime an hour to come up with a demand for 18 cents an hour.

Another indication (although nebulous) of the size of the increase to be asked is found in recent wage settlements outside the metalworking industries. The Amalgamated Clothing Workers, for example, have signed an agreement providing for a 12½ cent increase, bargained out of an original demand for 15 cents. Two years ago the ACW settled for 15 cents in advance of the national pattern which turned out to be 18½ cents. A year ago, ACW settled for 12½ cents in advance of a national pattern of around 15-16 cents. Should these ratios hold for 1948, a third round pattern of about 15 cents is indicated.

Operating brotherhoods of railroad workers have agreed to accept a 15½ cent increase in hourly pay, the same increase awarded the non-operating workers by arbitration last September.

EWAN CLAGUE

From the Bureau of Labor Statistics commissioner comes figures to show that the "real" wages (gross adjusted for tax payments and cost of living) are higher than in 1939. Despite rising prices, today's weekly pay buys more than in prewar days

When?—Wage agreements in the pace-setting metalworking industries—steel, automotive and electrical—either expire or may be reopened for wage negotiations during the first quarter of 1948. General Motors negotiations may be opened March 19. Electrical Workers discussions will start April 1.

Big Steel's contract may be reopened for wage discussions on April 5, although the contract signed last spring runs for two years. The contract between the United Steelworkers and the United States Steel Corp. subsidiaries contains a termination clause as follows:

"The terms and conditions of this agreement shall continue in effect until midnight April 30, 1949, provided however, that either party may, on April 1, 1948, give written notice to the other party of its desire to negotiate a general and uniform change in rates of pay. Within five days after the giving of such notice, the parties shall meet for the purpose of negotiating such issue. Failing agreement on such issue on or before April 30, 1948, this agreement shall remain in effect until midnight, April 30, 1949."

Excludes Welfare Demands?—This would appear to exclude negotiations on any issue other than wages next year, which may put a damper on the union's plan to bring in a bunch of welfare demands. Also, the U. S. Steel clause would appear to make it easy for the corporation to dominate wage discussions; if an agreement for an increase is not reached by April 30, the contract continues in force.

However, the U. S. Steel subsidiaries and the union agreed last year to make a survey of welfare plans for U. S. Steel workers. The union has retained Murray Latimer, who headed the President's guaranteed wage study committee last year, to help draft the plan.

It is possible that the corporation and the union may agree on a welfare plan before the time for reopening of wage negotiations. Should this be the case, the benefits of the welfare plan probably would be considered in the wage discussions.

Fabricators' Contracts—The great majority of steel fabricating companies' contracts expire in May and June, although a few expire earlier and a few later. The nonbasic steel companies protested vigorously this year against being included in the basic steel pattern settlement and argued their wage negotiations should be conducted on a company-by-company basis. To a considerable extent the fabricators won their point, although the basic steel pattern had an influence in their settlements.

Strike Outlook — At this time neither industry nor the unions anticipate any widespread work stoppages in 1948. The unions wish to avoid walkouts for several reasons. Some have no-strike clauses in their contracts. They hope to play an active part in the 1948 political campaign and will strive to avoid the public disfavor that would accompany strikes. They hope to gain wage concessions without work stoppages and believe this can be done in view of manufacturers' profit positions and the increased living costs.

STEEL WAGES OUTSTRIP COST OF LIVING RISE

	Cost of Living Index (1935-39=100)	Per Cent Increase Over 1939	Steel Average Hourly Earnings	Per Cent Increase Over 1939
1939	99.4	...	84.2	...
1940	100.2	0.8	85.4	0.9
1941	105.2	5.8	95.9	13.9
1942	116.5	17.2	105.6	25.4
1943	123.6	24.3	113.5	34.9
1944	125.5	26.2	121.9	44.7
1945	128.4	29.2	124.8	48.2
1946	139.3	40.1	134.7	59.9
Jan.	153.3	54.2	138.1	64.0
Feb.	153.2	54.1	137.0	62.7
March	156.3	57.2	137.9	63.7
April	156.2	57.1	153.3	82.0
May	156.2	57.1	155.6	84.8
June	156.0	56.9	154.7	83.7
July	157.1	58.0	153.9	82.7
Aug.	158.4	59.3	155.6	84.8
Sept. 15	163.8	64.7	157.1	86.6

Sources: Bureau of Labor Statistics and American Iron & Steel Institute.

Tax Relief or Foreign Aid—Which First?

EUROPE must receive aid from the United States. At the same time, cutting of government costs and tax reduction are much to be desired. On these points the national administration and the Republican majority in Congress agree in principle, but differ on how much, when and under what conditions each is to be done.

This was brought out in a forum on "Meeting the High Cost of Government" sponsored by the National Industrial Conference Board in New York recently. John W. Snyder, secretary of the treasury, presented the administration's viewpoint, and Charles A. Halleck, representative from Indiana and majority floor leader, presented the Republican viewpoint.

Tax Reduction—Secretary Snyder emphasized he was not opposed to tax reduction. "I believe tax reduction feasible and proper after we have met certain necessary prerequisite obligations," he said.

"I am convinced, however, that before deciding on tax reductions that Congress should first consider foreign aid within a balanced budget; second, adequate debt reduction, and third, equitable tax revision. When these necessary preliminary steps have been taken, consideration of equitable tax reduction would be in order."

Prompt Action — Representative Halleck held it essential to balance the budget at reasonable peacetime levels, and do it promptly, so that citizens may be accorded relief from burdensome wartime taxes and the public debt retired in an orderly fashion. He said the majority in Congress approves the principles of foreign aid but it would not "rubber stamp" the administration's recommendation nor make a "blank check" appropriation. "We have no intention of embarking on a world WPA program," he said, "which does a disservice to the recipients and threatens our own economic stability."

Chairman Named—The forum was a feature of the 291st meeting of the Conference Board at the Waldorf-Astoria, Nov. 20, at which announcement was made of the election of A. W. Robertson, chairman, Westinghouse Electric Corp., Pittsburgh, as chairman of the Conference Board to succeed the late W. Gibson Carey Jr., who had been president of Yale & Towne Mfg. Co., New York. Mr. Robertson has been councillor of the NICB since 1934 and a trustee since June of this year.

Two Tax Bills — Roswell Magill, chairman, Special Tax Study Committee appointed by the House Ways & Means Committee, said that a presidential election year is scarcely the most propitious time to put through a tax program. "Nevertheless," he said, "there is clearly a strong will in Congress to do the job in 1948."

He thought it likely that there would be two revenue bills in 1948: One, dealing primarily with rates and exemptions; the other, primarily with amendments to the tax structure to remove injustices and restrictions upon the proper functioning of the country's economy. He predicted the tax reduction probably will be largely limited to the individual income tax plus perhaps some of the excises.

Demand for WAA Surplus Industrial Goods Mounts

Following the recent spurt in disposal of government-owned surplus machine tools, War Assets Administration reports a similar jump in sale of other types of industrial equipment. As is the case in machine tools, a large portion of demand comes from the Joint Army & Navy Machine Tool Control Committee which started to requisition other industrial equipment during October. While no statistics are yet available, JANMAT has made "heavy" requisitions over the past couple of weeks for numerous types of materials handling equipment, standard and special types of welding equipment, heating and heat treating furnaces, air compressors, transformers, etc.

A considerable portion of the demand for such industrial equipment also is coming from private industrial organizations who have felt up to now that they had plenty of time to act but now, due to fears over the heavy takings of JANMAT, are closing without further delay. To stimulate this trend, WAA has been advising private owners of plants containing government-owned facilities that they no longer have an indefinite period within which to buy this equipment under the options given them as war contractors. WAA is setting a 30-day deadline for these companies as fast as it can go through the list. Failure to act within 30 days will deprive them of further protection of their options.

Present, Past and Pending

■ POLLAK STEEL ADDS 14-IN. ROLLING MILL
MARION, O.—Pollak Steel Co. has installed a 14-in. rolling mill as part of a $500,000 expansion program at its works here.

■ KAISER-FRAZER LEASES MORE SPACE
DETROIT—Kaiser-Frazer Corp. has leased an additional 142,000 sq ft of floor space at the Continental Motors plant here to be utilized in a $3 million modernization and expansion program.

■ ALLEGHENY LUDLUM TO ISSUE PREFERRED STOCK
PITTSBURGH—Allegheny Ludlum Steel Corp. plans to raise approximately $10 million through issuance of preferred stock. A special stockholders' meeting has been called for Jan. 6 to vote on the proposal. Proceeds are intended to help finance company's $15 million plant improvement program over the next four years.

■ FTC ASKS STEEL INDUSTRY RESPONSE BY DEC. 4
WASHINGTON—Federal Trade Commission has set Dec. 4 as the deadline for receipt of responses to its amended complaint against the American Iron & Steel Institute and member companies on pricing.

■ SIR ANDREW McCANCE HEADS BRITISH INSTITUTE
LONDON—Sir Andrew McCance will succeed Dr. C. H. Desh as president of the British Iron & Steel Institute next May 5. The president-designate is deputy chairman and joint managing director of Colvilles Ltd., Glasgow, and chairman of the council of the British Iron & Steel Research Association.

■ STAINLESS-CLAD FACILITIES TO BE INCREASED
WASHINGTON, PA.—Jessop Steel Co. will increase its production facilities for stainless-clad steel by 200 per cent, or from 500 to 1500 tons a month, by Jan. 1, 1948.

1948 Seen Repetition of 1947 in Steel

Republic president tells Pressed Metal meeting he expects production to fall several million tons short of effective demand of 66.5 million tons

REFERRING to himself as "one of the Moguls of Metal to whom your president refers in such lurid language," C. M. White, president, Republic Steel Corp., Cleveland, last week in a straight-from-the-shoulder address to the Cleveland District of the Pressed Metal Institute at Hotel Cleveland, Cleveland, laid the facts on the line concerning steel production, distribution and fabricating activities of the steel companies.

The steel executive minced no words as he spoke to the pressed metal men who packed the ballroom of the hotel to get the "low-down" on the steel shortage. Spokesmen for the stampers have been among the severest critics of steel industry production and distribution policies in recent months.

Departs From Address—Departing at times from his prepared address, and later in a question and answer period, Mr. White pulled no punches as he sought to put the steel consumers straight on various questions raised as a result of the acute sheet shortage.

He predicted 1948 will be a repetition of 1947 as far as steel availability is concerned, and said that he thought it would be two years before many of the war-engendered shortages were filled. He denied the steel companies were favoring their own fabricating subsidiaries in the matter of steel supply, and ridiculed the statement that Republic Steel Corp. was banker-dominated. Gray market operations, he said, couldn't possibly involve as much tonnage as reported.

The question of basing points and the recent policy of the steel companies to withdraw from market areas distant from their plants because of reluctance to absorb heavy freight charges was not touched upon in Mr. White's prepared address. However, after an address by Tom L. Smith, president of the Pressed Metal Institute, in which the various charges against the steel industry were summed up, Mr. White, in a rebuttal in which he described some of Mr. Smith's statements as "cockeyed," stated that, while he couldn't speak for the steel industry as a whole, it was the policy of his company to withdraw from distant markets. However, such withdrawal was made only after customers in the abandoned areas had been given sufficient time in which to make new supply connections.

Anticipates Pricing Change—This withdrawal from distant markets, he said, was in part anticipatory to the day when under government order the steel companies may be compelled to abandon the basing point system of pricing. (The Federal Trade Commission currently is pressing a new action against the steel industry aimed at eliminating basing point pricing).

Mr. White warned steel production cannot increase much more than 1 million tons in 1948 despite enlarged production facilities—2,500,000 tons of ingots and 3 million tons of sheet and strip.

Recent survey, he said, shows effective steel demand for the 12 months beginning Sept. 1, 1947, to be about 66.5 million tons of finished steel. This year's record-breaking peacetime output of 62 million tons cannot be greatly exceeded next year in view of coal and scrap shortages, and likely production interruptions this winter due to gas shortages. Sheet and strip production this year he placed between 17 and 18 million tons, a new record.

While increased capacity will alleviate the tight supply situation to some extent, he said he felt total steel production will be several million tons short of effective demand in 1948, since he did not expect the level of general business activity to drop more than 5 per cent and almost none of this drop will be in the hard goods lines.

Steel Shortage No Mystery—Proud to be associated with an industry turning in a magnificent production performance in face of insuperable difficulties, Mr. White declared there is no mystery about the steel shortage. The stamping industry is no different from any other in its need for more steel, he said. The simple fact is the American steel industry, producing more tonnage than the rest of the world combined, cannot make up quickly a tremendous war and depression shortage in durable goods, build, equip and provide an inventory for countless new plants and at the same time satisfy a current demand for steel based on the highest national income in history.

C. M. WHITE

He denied the steelmakers are engaged in a program of planned scarcity. Current output not only is record-breaking for peacetime, but the industry is spending more than $1 billion for improvement and expansion. He warned those who advocate vast expansion of the steel industry have no appreciation of the situation in raw materials and scrap.

Situation Not Understood—"I doubt whether the people of this country really understand the magnitude of the steel industry," Mr. White said. "It is doubtful if they realize that the raw materials used in our steel plants alone each day require a train load of material 133 miles long. Talk of adding 10 per cent or a 13-mile train load of raw materials per day simply means that the people who make these statements do not understand the basic facts.

"The country was combed thoroughly for scrap several times during the war," Mr. White declared, "and there are apparently no large untapped

reserves of remote scrap. Scrap will therefore remain tight until the steel industry drops back from its present capacity rate of operation.

"In Republic," he continued, "any major expansion would require completely new integrated steel plants. Simultaneously new raw material sources would have to be developed. At today's high construction costs, such new capacity costs more than $200 per ton. The ton book value of existing facilities is $50. This would mean that steel produced in this new capacity would have to sell at least $20 per ton above the current market."

Would Cut Shipments—Further, he pointed out, new fully integrated steel capacity started today could not become fully effective before 1950, and the building of such facilities would take from current shipments to consumers 2 million tons of steel for each 10 million tons of new capacity.

Commenting on the charge that the steel producers were pouring steel into their own fabricating plants while independent fabricators were left to starve for metal, Mr. White, emphasizing that he could not speak for the industry, said that as far as his own company, Republic, was concerned, the charge is definitely contrary to the facts.

Blue-Sky Hokum—"What has been ladled out to you and to some of the Washington committees is just pure, blue-sky hokum as far as Republic is concerned, and I am reasonably sure this applies to most of the major steel producers," he said.

Pointing out that there is nothing new about Republic's fabricating plants, with one exception they have been in Republic's family from 12 to 25 years—he said his company allots steel to them on a historical quota basis just as it does to all its customers and these fabricating subsidiaries pay the full market price for every pound of steel they receive.

"In the 1939-1940 prewar base period," he said, "our fabricating divisions received 8.7 per cent of our total shipments. In 1947 they have received 6.8 per cent, decrease of almost 2 per cent. Not one of these plants is operating even close to capacity, and it isn't for lack of orders, either.

"On the other hand, what has Republic done for the stamping fraternity? A check of the Pressed Metal Institute roster shows that we have been shipping steel to 54 of the active member companies. Our records show that in 1946 we shipped these 54 stampers a substantial increase over their base period tonnage with us. In 1947, if we maintain the rate, we will ship an even greater increase over their base period tonnage.

Confused Thinking—"Incidentally, I was greatly amused by some parts of a statement made before the Steel Subcommittee of the Senate Small Business Committee at Washington by Earl A. Graham of the Federal Trade Commission. He is listing the fabricating activities of the various steel producers. In Republic's case his chart shows wire products and pipe as activities which compete with independent buyers of basic steel. Any school boy knows that these lines have been mill products since time immemorial.

"To show you how silly and how slanted such thinking is, the nonintegrated producers of fence, nails and other wire products account for only 5.5 per cent of our national production. The nonintegrated pipe mills turn out only 7.5 per cent of our total output. The country would be in sad shape if the producing mills withdrew from these lines. If the thinking of Mr. Graham and others who agree with him were followed to its logical conclusion, the steelmaker would produce nothing but ingots, which in turn would be converted into a great diversity of finished products by fabricators. It's a noble idea, but I'm afraid those finished steel products would cost at least $300 per ton."

Referring to "gray" market operations, Mr. White branded as absolutely fantastic assertions that 2 million tons of sheet steel have gone into such channels; that the most careful estimate his company can make is that the "gray" market represents between 3 and 4 per cent of the sheet steel produced.

Market Magnified—In his opinion the "gray" market in steel has been magnified out of all proportion to the realities, and such marketing is not peculiar to steel, being experienced in virtually every scarce product. He said Republic does not sell steel to agents and brokers, or to any concern it does not know or with which it has not established commercial relations. Some tonnage gets into the "gray" market, he said, when customers release a part of their regular allotments into illegitimate channels. It is almost impossible to trace such deals from the buyer to the original source of the metal. When customers are caught releasing tonnage to the "gray" market Republic parts company with them.

Declaring that no accurate estimate of the "gray" market can be made, Mr. White said that the 2 million tons publicized as moving in this market are fantastic. That is more flat rolled steel than the combined jobbers in the U. S. will re-

(*Please turn to Page* 171)

OPPOSE CONTROLS

Steel allocations by the government were opposed by 14 top steel executives in a conference with Secretary of Commerce W. Averell Harriman last week. The steel men indicated they would be willing to channel steel voluntarily in a few cases where the government reported the existence of urgent foreign or domestic needs. The voluntary allocations would be similar to the steel allotments now being made to builders of railroad cars and of pipe to the western farm areas of the country.

Steel Ingot Production Statistics

	Estimated Production—All Companies								*Calculated weekly production all companies	Number of weeks in mo.
	—Open Hearth—		—Bessemer—		—Electric—		—Total—			
1947	*Net tons	Per cent of capac.	Net tons	Per cent of capac.	*Net tons	Per cent of capac.	*Net tons	Per cent of capac.	Net tons	
Jan. ...	6,544,841	95.1	384,096	87.7	284,309	65.9	7,213,246	93.0	1,628,272	4.43
Feb. ...	5,830,371	93.8	314,912	79.6	276,779	71.1	6,422,062	91.7	1,605,515	4.00
Mar. ...	6,614,369	96.1	378,893	86.5	314,224	72.9	7,307,486	94.3	1,649,545	4.43
1st qtr..	18,989,581	95.0	1,077,901	84.8	875,312	69.9	20,942,794	93.1	1,628,522	12.86
Apr. ...	6,360,000	95.4	375,675	88.6	306,422	73.4	7,042,697	93.8	1,641,654	4.29
May ...	6,634,716	96.4	372,878	85.2	321,903	74.6	7,329,497	94.5	1,654,514	4.43
June ...	6,312,674	94.7	351,247	82.8	304,744	73.0	6,968,665	92.8	1,624,397	4.29
2nd qtr..	19,307,990	95.5	1,099,800	85.5	933,069	73.7	21,340,859	93.7	1,640,343	13.01
1st 6 mos...	38,297,571	95.3	2,177,701	85.2	1,808,381	71.8	42,283,653	93.4	1,634,467	25.87
July ...	6,028,707	87.8	256,125	58.6	285,322	66.3	6,570,154	84.9	1,486,460	4.42
Aug. ...	6,324,456	91.9	346,033	79.0	311,597	72.2	6,982,086	90.1	1,576,092	4.43
*Sept. ..	6,147,448	92.4	334,425	79.0	306,769	73.6	6,788,642	90.6	1,586,131	4.28
*3rd qtr.	18,500,611	90.7	936,583	72.2	903,688	70.7	20,340,882	88.5	1,549,191	13.13
*9 mos..	56,798,182	93.7	3,114,284	80.8	2,712,069	71.4	62,624,535	91.8	1,605,757	39.00
†Oct. ...	6,831,508	99.3	384,272	87.8	348,522	80.8	7,564,302	97.6	1,707,517	4.43

* Revised. † Preliminary figures subject to revision.

For 1947, percentages of capacity operated are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 net tons bessemer and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of Jan. 1, 1947, as follows: Open hearth 81,010,990 net tons, bessemer 5,154,000 net tons, electric 5,076,240 net tons, total 91,241,230 net tons.

Machine Tool Show Begins To Pay Off

October ordering of new tools rises 28 per cent over previous month as industry changes its sales talk. Shipments climb to year's second highest level

PAY-OFF of the 1947 Machine Tool Show became tangible for the first time in statistics on volume of new firm orders booked by the machine tool industry in October as reported to the National Machine Tool Builders' Association, Cleveland.

Despite undercurrent in some segments of the trade that sales stimulation by the show has not been all that was expected, the industry experienced a 28 per cent gain in new ordering over September, and October's dollar volume of ordering was exceeded in only two months of the year.

Important, too, from the builders' viewpoint was the low volume of cancellations received during the month: only two other months this year, August and September, had lower cancellations in dollar value, and in these months cancellations in relation to new orders were much higher than in the latest month.

Selling Slant Changed—There has been much hesitation recently among companies using metalworking machinery as to the advisability of replacing production equipment in the period of uncertainty over business conditions and rising costs. Part of the show's purpose was to dispel the fear of over-investing in new machinery through a concerted effort to show that only by modernizing production equipment could costs be trimmed and the price of a company's product kept within the buying power of the public.

Members of the association at its recent annual meeting generally were agreed that their sales efforts henceforth must be geared to a new concept of machine tools; they envision their sales task now as not one for disposing of machine tools, but rather one of selling a production philosophy that will result "in more goods for more people at lower cost."

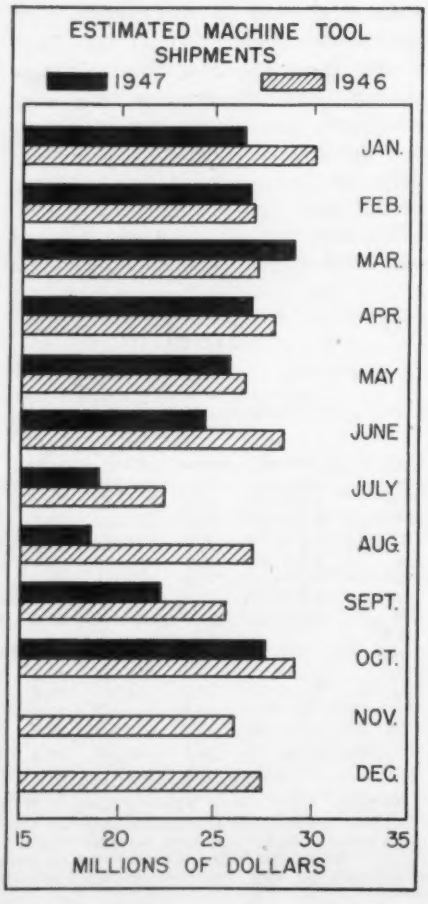
Trade leaders know this changed sales outlook will not bring buyers flocking to their sales rooms any more than the show entirely eliminated potential customers' attitude of "wait and see," but in the long run it will be more important than minute details of a machine's construction or its outward appearance.

Shipments Show Spurt — In line with the gain in tool ordering in October, the industry's shipments in that month were second to only one month this year and were estimated at $27,545,000, a gain of 24 per cent over the previous month. Rate of shipments, however, continues in excess of new ordering and has cut a sizable slice out of the industry's order backlog this year.

Foreign demand, rendered inarticulate by the shortage of dollar credits abroad, shrunk in October, foreign orders as a percentage of total orders placed declining to the second lowest level of the year. Cancellation of foreign orders also showed disturbing symptoms, rising to almost double the year's average as a percentage of total cancellations.

Machinery Group Urges Changes in Depreciation

Industry's policy of depreciating plant and equipment on the basis of acquisition costs far below present prices is resulting in erosion of real capital, understatement of costs, overstatement of profits and in some cases in underpricing of products, according to the Machinery & Allied Products Institute.



Since 1939 the country's price inflation has been, conservatively, 50 per cent, and by most indexes is higher than this figure, the institute reports. Purchasing power of the dollar, consequently, is at least one-third lower. The problem, then, is to develop a depreciation policy allowing recovery of the cost of an asset in dollars of equivalent purchasing power. Or ideally, to recover each year a sufficient number of "current" dollars to equal that year's capital consumption in terms of "original" dollars. Under-depreciation resulting from overlooking the dollar's lower buying power for corporations alone now is about $1.5 billion a year and income before taxes is overstated by an equal amount.

Although advocating revision of tax laws to permit accumulation of nontaxable depreciation reserves to cover present costs, the institute points out that adjustment of depreciation, even though disallowed for tax purposes, should still be made by management in its own accounting because a realistic allowance for depreciation is essential to the correct determination of costs and consequently of net income. Moreover, "the overstatement of profits inherent in original-cost depreciation at the present time not only gives the impression to the public, including employees, that the enterprise is making more than it really is, but it also is likely to lead to dividend payments that would not occur if the true facts were recognized."

Grinding Wheel Group Ordered Dissolved by U. S.

Grinding Wheel Manufacturers Association, Worcester, Mass., the membership of which included the makers of about 95 per cent of all abrasives produced in the United States, has been ordered dissolved by the Department of Justice in a final judgment entered in the U. S. District Court in Boston.

The defendants who consented to the judgment are: Grinding Wheel Manufacturers Association; Norton Co., Worcester, Mass.; Carborundum Co., Niagara Falls, N. Y.; Bay State

Abrasives Products Co. Inc., Westboro, Mass.; Simonds Abrasive Co., Philadelphia; and Macklin Co., Jackson, Mich.

In addition to ordering the association's dissolution, the judgment prohibits any agreements among manufacturers fixing prices, discounts or other terms of sale, or establishing classifications of customers, and each defendant individually is required to revise its price list.

Steel Allocation Seen Spur to Subcontracting

Threatened with the possibility of steel allocation as part of the administration's anti-inflation and foreign aid program, purchasing agents for large manufacturers are expected to step up subcontracting of machine parts.

This move, as explained by George Renard, executive secretary-treasurer, National Association of Purchasing Agents, involves farming out parts to those companies with historical records as large steel users, who might be in relatively more favorable position to continue this production than the original builder if allocations should be attempted.

Worrying purchasing agents are the questions "What products will be considered as essential?" and "How much more complicated will purchasing become under new laws?"

It is rather generally doubted by this group whether some prices can be controlled and others left free, as the administration suggests. Price controls, it is felt, may have a backfiring effect on inflation if they knock out the policy being used by some suppliers by which two quotations are given—one at a higher level for immediate delivery and the other at a lower price for delivery in six months or a year.

Ryerson Builds Addition To Cleveland Warehouse

New offices and an addition to existing warehouse facilities at E. 53rd St. and Lakeside Ave., Cleveland, have recently been completed by Joseph T. Ryerson & Son Inc., Chicago, distributor of steel from stock.

Construction of the new unit was started in 1946 with the demolition of a portion of the old warehouse. The new building provides 80,000 additional sq ft of warehouse space and approximately 13,000 sq ft of space in which are housed the company's offices.

First of 100 new boxcars of extraordinary length for fast overnight merchandise service on the Pennsylvania Railroad are shown leaving the road's shops at Altoona, Pa. Cars have an inside length of 60 ft 6 in., or a third longer than average, and have a capacity for 50 tons

ODT Wrestles with Car Problem

HOW TO BOOST freight car production to 15,000 units a month by next July is the problem now confronting the Office of Defense Transportation. Laid in ODT Director J. Monroe Johnson's lap by the White House, which considers the shortage of rail equipment of prime domestic importance, the problem becomes all the more difficult in view of current inability of the car builders to meet the 10,000-unit goal set up for the latter part of this year.

Output of the builders and railroad car shops in October was 8364 cars and in the first half of November amounted to 4398. November's total was expected to exceed 9000. Capacity of the industry, however, is estimated at 17,000 cars a month, but shortages of steel and other materials and of skilled labor have prevented the industry from using its facilities to the limit.

Cars on Order—The railroads have been striving mightily to replace their worn-out rolling stock, and car and locomotive builders have the largest accumulation of orders in years. Independent builders figure their order backlogs for freight cars at about $350 million and for passenger cars at $200 million.

The industry is anxious to step up production and keep its shops operating at nearer the capacity level but hesitates to begin on some contracts until inventories are in better balance for fear of being stuck with a large number of unfinished cars. This quandary applies equally to locomotive builders, who, in their large-scale switch to diesel engines, are faced with shortages of copper and electrical equipment.

More Steel Promised — The three factors limiting production — not enough steel, unbalanced inventories and shortage of skilled labor—are being scrutinized by Colonel Johnson's agency, and following a recent conference with the American Iron & Steel Institute, he announced that the steel industry is committed to an increase of plates, sheets and other items in short supply as well as for more steel to be used for repair of "bad order" cars. Steel Task Committee of AISI will soon confer with ODT as to arrangements for new allotments which should increase steel supply in 1948 by 22 per cent, but this increase is not expected to show its real effects until March when January rollings will become available for fabrication.

The bulk of the increase will be slated for the repair program, Colonel Johnson said, adding that 43 per cent more steel should be allotted for repair of cars now standing idle. Stepped-up allocations in January are expected to allow between 3500 and 4000 cars to be put back into service a month. Currently, 19 roads have 44,631 freight cars out of service for repairs.

Projecting the effect of the increased steel supply on the nation's rolling stock, Colonel Johnson said car builders and shops should be able to make a gross monthly addition by January of 14,000 cars, none of which would be tagged for export.

Integration of Aluminum Plants Sought

SERIOUS power shortage is preventing capacity operations of Permanente Metals Corp. aluminum plants in the Pacific Northwest, but this Henry J. Kaiser activity nevertheless is considering steps toward integrating the aluminum industry it is building on the West Coast.

With its new reduction plant at Tacoma, Wash., gradually stepping up output, Permanente hopes to establish an aluminum foil rolling mill at Spokane, Wash. If the proposal succeeds it will be the first foil mill west of the Mississippi and Permanente's first venture into that branch of the business.

Bids on Foil Equipment—The company has submitted a high bid of $250,000 for foil plant equipment now located in Germany. If the U. S. government accepts the bid, the equipment will be moved to Spokane as soon as feasible, according to Howard Holmes, an official of Permanente's Aluminum Division.

Although such a move would be a further step toward consolidating aluminum operations in the Northwest, Permanente still faces two major barriers in its effort to fully integrate its operation.

The first of these is a lack of mills to produce alumina from bauxite, which is the most commonly used aluminum ore. The second drawback is lack of extrusion plants to turn pig aluminum into shapes which can be used by fabricators.

Bauxite Imported—Most bauxite now being used in Pacific Northwest reduction plants comes originally from Dutch and British Guiana and is processed into alumina at plants in Alabama and St. Louis before being shipped to the plants in Washington state.

As bauxite can be supplied by the Netherlands East Indies and the Pacific island of Yap, it is hoped that eventually bauxite can be obtained from the Pacific area and reduced in West Coast alumina plants.

BUSY BOEING: Increased production activity at Boeing Aircraft Co. headquarters at Seattle is shown in this photo of part of the final assembly area. Visible are the wing assembly line in foreground, and final assembly operations on C-97 Stratofreighters, Stratocruisers and, far right, B-50 bombers. The C-97s and bombers are for the United States Air Force

Coal Shortage Cuts Geneva Production

Geneva Steel Co. now is producing at a rate of 85,000 to 90,000 tons of steel ingots monthly, according to Dr. Walther Malthesius, president of the Utah subsidiary of U. S. Steel Corp. However, he pointed out recently that production is handicapped by inadequate coal supply, result of a scarcity of transportation and mining equipment.

"The Geneva coal mine," he said, "currently is producing at the rate of about 4500 tons of coal daily. This is about 25 per cent less than the output we would like to attain."

Dr. Malthesius also reported that progress is being made slowly on the company's expansion program. When U. S. Steel purchased Geneva from the government it announced it would spend not less than $18,600,000 converting the mill to peacetime products. Dr. Malthesius said orders now have been placed for about $16 million of this amount. Some equipment is beginning to arrive, but shortages are holding back delivery of other orders. As a result, Dr. Malthesius said he is unable to estimate when the conversion program will be completed.

Expect More Nails Next Year

NAIL production in the United States should come to some 18 million kegs in 1948 compared with some 16 million in 1947, on the basis of assurances by producers to Sen. Joseph R. McCarthy (Rep., Wis.) in connection with investigations of the Joint Congressional Committee on Housing.

The committee is planning further action on allegations of nail gray market sales at premium prices, notably in the Northwestern, South Central and Northeastern states, and Senator McCarthy says that some of the concerns cited to the committee as gray market operators may be called to Washington to tell their stories.

Tonnage Reimported—The committee is particularly concerned with reimport into the United States at gray market prices of American-made nails shipped to Puerto Rico. It also is trying to ascertain what is happening to unduly large tonnages of nails exported to the Philippines.

Senator McCarthy, as a means of getting all details of the nail business, has sent a questionnaire asking producers to answer questions as to production, capacity, raw materials supply, and distribution.

The questions under the latter head are aimed at obtaining the names of all warehouse, jobbing and other distributors, as well as the names of companies that buy for direct consumption.

Pare Europe's Steel Needs!

That's suggestion of House Committee on Foreign Aid in report which envisions intolerable sacrifices by American steel consumers in proposed relief plan

HEAVY and intolerable sacrifices will have to be made by American consumers of steel in 1948 unless steel end-use programs of the Committee of European Economic Co-operation undergo marked reduction or unless steel production in western Germany can be raised significantly without resort to American metallics.

That is the conclusion of the House Select Committee on Foreign Aid in its report, "United States Steel Requirements and Availabilities As They Affect European Needs for Interim Aid." Heading the committee are Rep. Charles A. Eaton, New Jersey, chairman, and Rep. Christian A. Herter, Massachusetts, vice chairman.

Paring Seen Possible — The committee expresses the belief that CEEC demands could be pared down and that there possibly are alternatives, under which other countries would provide assistance.

Pointing out that domestic and export demand for rolled and drawn steel products in 1947 will be at least 1.6 million tons greater than supply from mills in the United States, the committee said that "honoring the CEEC participants' demands upon the United States in 1948 would aggravate the overall shortage immensely."

Raise Imports — Delving into the problem, the committee reported: "In rolled and drawn products the CEEC nations are requesting at least 1.2 million net tons more than their annual rate of receipts from the United States during the first half of 1947. Moreover, they propose to raise their imports of metallics by some 2.1 million net tons, 1.7 million net tons in the form of steel scrap and pig iron as such and 400,000 net tons of potential steel scrap contained in the additional tonnage of rolled and drawn shapes.

"Meeting these claims in full would involve reducing United States production of rolled and drawn products by some 2.2 million net tons and cutting commercial exports or shipments to domestic consumers by 3.4 million net tons. The net effect," the committee asserted, "would be to raise the minimum deficit from 1.6 million net tons to 5.0 million net tons—a staggering deficit to impose on the consumers of steel in the United States and on commercial exports." CEEC participants' 1948 import requests from the U. S. are shown in the accompanying table.

The committee declares, however, that a tentative review of CEEC steel production and distribution programs for 1948 suggests that the legitimate needs of the Paris Conference countries could be met without those adverse effects, and recommends a thorough scrutiny of the programs.

Suggests Examination—The committee points out that an examination should be made concerning the immense steel tonnages planned for export from the CEEC area. Says the committee, "In 1948, the 16 CEEC nations propose to ship to nonparticipating countries, excluding western Germany, 1.47 million net tons more than their exports to nonparticipating countries including western Germany in 1938.

CEEC PARTICIPANTS' 1948 IMPORT REQUESTS FROM U. S.

	(thousands of net tons)
Ingots	374
Refinishing billets	913
Forging billets	110
Slabs	440
Sheet bars	110
Total semifinished	1,947
Hot finished strip	297
Tube strip	33
Sheets	424
Tin plate	320
Wire, pipe, tubing, shapes	125
Total finished steel	1,199
Scrap	1,539
Pig iron	200
Total metallics as such	1,739
Potential recirculating scrap semiproduct and finished steel products	753

"Moreover, deliveries to dependent overseas territories are scheduled to reach 990,000 net tons as against a total of 330,000 net tons in 1938—660,000 net tons increase. Thus, total exports to outside areas will exceed 1938 levels by 2.13 million net tons, or roughly two-thirds of the prospective adverse impact of CEEC nation demands" upon the United States.

"The Paris Conference Steel Report does not provide any justification for the increased export rates."

Raises Two Questions—Concerning availability of metallics abroad, the committee raises the questions: 1. Whether aggregate volume of metallics shown as available for steel ingot production and foundry pig iron needs is not more than sufficient to support the estimated furnace output; and 2. whether the estimated home scrap supply figure is not too low in relation to the recirculating scrap tonnage one would expect to arise from forecast home steel production plus a reasonable allowance for obsolescent scrap. "To the extent that needs are overstated, or availabilities understated, of course, the need for scrap or pig iron imports from the United States would diminish," the committee observes.

One source of hope is the possibility of increasing western Germany's steel ingot production at a more rapid rate than now envisaged, the committee believes. "There is widespread belief that substantial additions could be had in 1948 and 1949 by means which would not involve scrap imports from America or a corresponding reduction in output in the CEEC area." Principal means would be through use of additional rich ore supplies which Sweden could provide readily; "this seems the major hope of meeting European deficits," the committee asserts.

Scrutinize Estimates—The committee further suggests that home steel consumption estimates given for several countries be scrutinized, adding that "a careful check of some estimates would prove rewarding."

Continuing, the committee declares "a review of the major steel expansion programs under way in the United Kingdom, France, and several other nations would seem appropriate. Such programs are large consumers of home-made steel as well as scarce equipment to be supplied by the United States." This prompts the committee to raise this question: "Before building up export steel capacity for the future in Europe at very heavy cost to production for consumers' steel today, is there not a real need to look at the prospect for marketing the capacity that will result and its probable contribution to a lack of world balance harmful to all concerned?"

October Cash Dividends Increase by 23 Per Cent

Publicly reported cash dividends paid out by United States corporations during October amounted to $422 million, an increase of 23 per cent over the totals disbursed in October of last year, the Department of Commerce has announced.

For manufacturing as a whole, August-October payments were 26 per cent higher than a year ago. Increases by corporations in nonferrous metals and automobiles exceeded 50 per cent.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Forms for first Census of Manufactures since 1939 to go out in January. Some 250,000 firms in 469 separate industries to be queried. Industry co-operation urged

NEVER before has the demand for a Census of Manufactures been so eager as for the one to be conducted in 1948. First, this will be the first such census since 1939. Second, for planning purposes, business executives nowadays make much more extensive use of this type of data than in the past.

The National Association of Manufacturers, Chamber of Commerce of the United States, state and local chambers of commerce and boards of trade, and trade associations are impressing on their members the importance of giving complete and accurate information to the Bureau of the Census.

This co-operation is particularly necessary on this occasion because the bureau, to cut costs and to expedite the work, is going to depend on the mails to a large extent in doing this job. It is preparing to send out in January some 200 different forms to some 250,000 firms in 469 separate industries.

Data Forms Cleared—The substance of these forms has been cleared with representative manufacturers and with trade associations so as to bring forth the information that is generally desired. Incidentally, one of the big jobs now finished was to set up the list of manufacturers to whom the forms are to be sent. The Census Bureau started out with over 500,000 names. Many firms and corporations were found to have merged or gone out of business, and many non-manufacturing organizations had to be eliminated. By the time this preliminary task was completed in November, the list had been cut in half.

All manufacturers will be queried for data on their 1947 employment, labor turnover, payrolls, etc.; for their costs of materials, supplies and services; for their inventories of "selected" key raw materials at year's beginning and at year's end; and for details of equipment, including such items as number of highway-type trucks operated. All will be asked for information about number of manufactured items, and value of product in 1947. Other questions will cover selling and distribution costs, overhead, and other matters pertinent to the census.

Metalworking Facilities — Forms that will go to the metalworking industries will ask for data on the facilities at each plant—as, whether the plant has a die-casting, heat-treating, foundry, machine shop, plating, forging or other department. Capacities will be sought. Foundries, for example, will be asked to state how many melting units they have, of what types and also of what capacities.

Overall boss of the 1948 Census of Manufactures is Maxwell R. Conklin, chief of the bureau's Industry Division. He has the active assistance of William H. Mautz, assistant chief of the Industry Division. Various associates will handle the job by industry units. Owen Gretton has been assigned the portion of the work dealing with metals production and metalworking. Overall responsibility for carrying out all details and conducting the job to a conclusion has been made the assignment of Frederick Cone.

Preliminary reports will start to be issued, it is expected, around June or July. These will cover individual industries—mostly the smaller industries in which relatively few concerns are engaged. Final reports are not expected to come out much before the end of 1948.

GAGE STEEL DEMAND

Market analyses are vital in the steel industry's long-range business plans and "without an adequate knowledge of markets . . . plans for the future must be based on something less than air," Francis Juraschek, commercial research division, Carnegie-Illinois Steel Corp., Pittsburgh, told the Pittsburgh chapter of American Society for Metals at its monthly meeting recently.

In contrast to the marked technological progress in the steel industry during the last half century, he pointed out, similar progress in lowering the cost of distribution has not been made.

Tariff Cuts Protested

Publication of the tariff reductions granted many foreign products at the reciprocal trade agreements conference at Geneva has stirred up a lot of resentment in Congress. Needled by complaints from many of their manufacturing constituents, some congressmen already have protested sharply on the floor but, as Chairman Harold Knutson (Rep., Minn.) of the House Ways & Means Committee pointed out, there probably is no way by which Congress can prevent the tariff reductions agreed to at Geneva from becoming effective on Jan. 1.

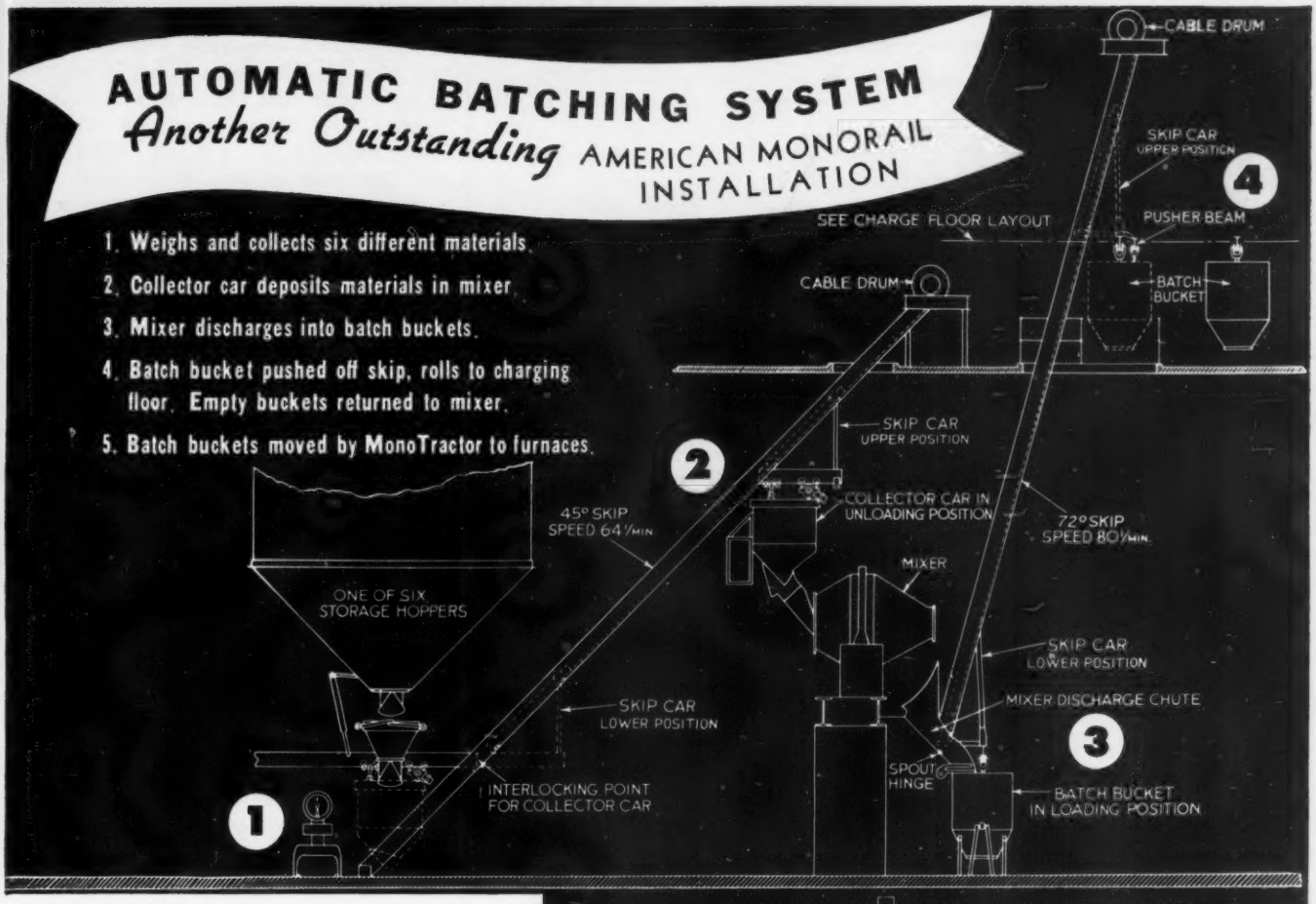
The Geneva program, he pointed out, was carried out under the Reciprocal Trade Agreements Act. While the stage appears to be set for a thorough combing of the entire situation when the act, now due to expire June 30, comes up for extension, there is some question as to what Congress will do. A feature of the Geneva pacts is that they have minimum life of three years, with the participating nations privileged to withdraw upon due notice after that period. Another is that many existing rates were "bound" at Geneva for the life of the agreements. These features may tend to tie the hands of Congress next year.

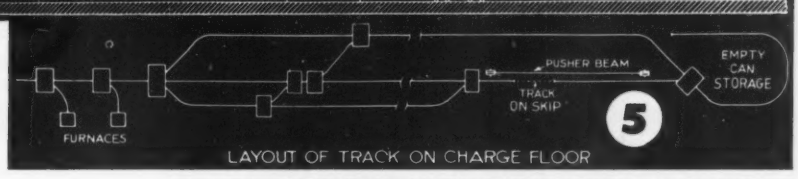
Weights & Measures Office

The newly established Office of Weights & Measures, National Bureau of Standards, with R. W. Smith as chief, is to correlate the bureau's relations with state and local officials having to do with weights and measures. It has the responsibility for issuing amendments, adopted annually by the National Conference on Weights & Measures, to the model State Weights and Measures Law. It also will get out a new edition of the Bureau's publication on Federal and State Laws Relating to Weights and Measures. Inasmuch as regulation of weights and measures is a function of the states and municipalities, the bureau will act only in an advisory capacity. It will advise the Federal Trade Commission and the Food & Drug Administration in cases involving goods moving in interstate commerce. It also will prepare plans for an advanced training

AUTOMATIC BATCHING SYSTEM
Another Outstanding AMERICAN MONORAIL INSTALLATION

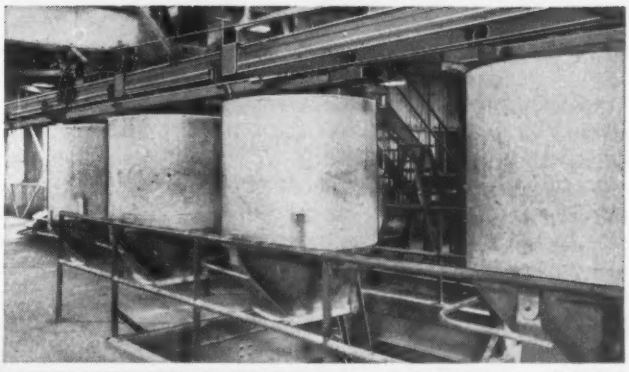
1. Weighs and collects six different materials.
2. Collector car deposits materials in mixer.
3. Mixer discharges into batch buckets.
4. Batch bucket pushed off skip, rolls to charging floor. Empty buckets returned to mixer.
5. Batch buckets moved by MonoTractor to furnaces.





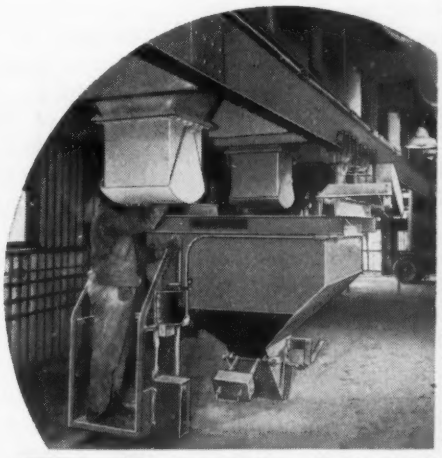
LAYOUT OF TRACK ON CHARGE FLOOR

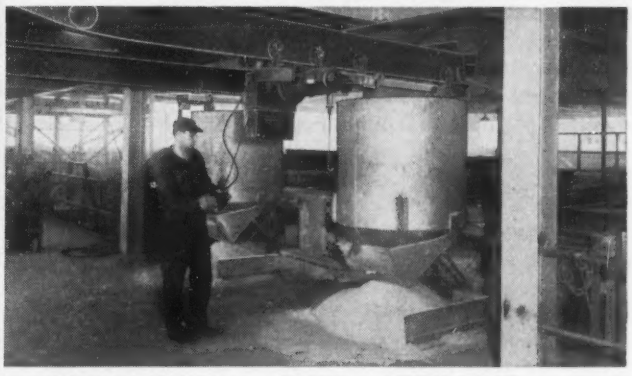
This installation in a large glass plant again demonstrates the versatility of American MonoRail engineering and equipment. Thirty tons of glass batch per hour are measured, mixed and delivered to furnaces by push button control. Let an American MonoRail engineer talk to you about your handling problems. He will show you how to save money and speed up production.



SEND FOR BULLETIN C-1

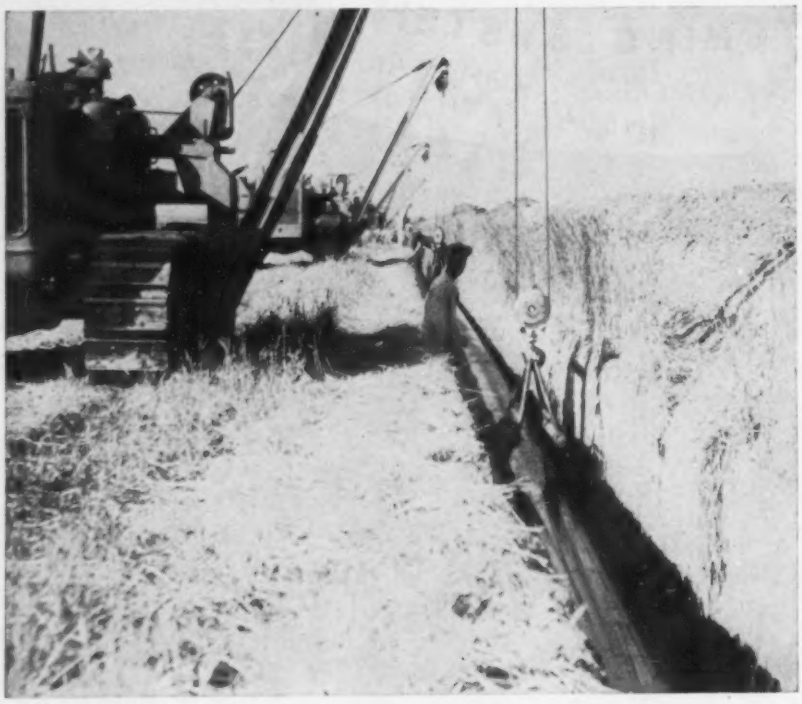
A 56-page book showing successful applications of American Mono-Rail Systems.





THE AMERICAN MONORAIL COMPANY

13102 ATHENS AVENUE **CLEVELAND 7, OHIO**



PIPELINE LAYING: Three hundred yards of 30-in. casing is lowered into a ditch by eight crawler-type tractors with side-mounted winch derricks as the North America Pipe Line Co. lays a new line across Kansas from Texas to Chicago. NEA photo

course for state and local weights and measures officials, by means of lectures and laboratory work in the bureau's Washington plant.

Munitions Conferences

Members of industry advisory committees of the Munitions Board who were expecting to be invited to attend Washington conferences this fall probably now will not be called to such meetings prior to early next year. The reason is a lack of certainty as to what functions formerly handled by the Munitions Board hereafter will be taken over by the new National Security Resources Board. Top officers of the two groups are trying to work out the line of demarcation for responsibility over industrial plants, stockpiling, etc.

Export Regulations

In view of the "critical supply of pipe and casing," the Office of International Trade has decided that a maximum of 250 feet of pipe or casing hereafter may be exported under general license as part of a pump installation, regardless of pump capacity. For any amount in excess of the 250 feet, validated licenses for export are required.

The fourth quarter export quota of fractional horsepower motors has been set at 100,000 units; this covers motors ranging from 1/8 to and including 1/3 horsepower.

These supplemental quantities have been set over and above previously fixed fourth quarter export quotas: 166 net tons of cast iron pipe and cast iron pipe fittings; 200 aluminum prefabricated houses; 37 tons of lead sheets and pipes and 5 tons of lead solder rigid metal conduit and other metal conduit to the value of $226,590.

The value limit, per shipment, has been set at $5 for woven wire insect screen cloth of any metal for export under general license to Group K destinations. No shipments are permitted to Group E destinations.

Military Research Pushed

If the present struggle with the Russian Soviets for political and economic position switches over into a shooting war, we will have to thank them for providing the stimulus for much of our present effort to prepare for such an eventuality. That angle of our military research and development programs was clearly revealed during the two-day conference of Navy bureau heads with some 600 members of the Navy Industrial Association on Nov. 18 and 19. Rear Admiral A. G. Noble, chief of Naval Ordnance, told the gathering that the Navy's expanded research program had received impetus from the knowledge that Germany's best weapons are being developed by the Russians.

The war ended, he pointed out, before some of the latest German inventions reached the battle front. These weapons in the hands of a hostile power would, if not combatted, he said, "constitute a severe threat to our national security."

Dr. T. J. Killian, science director of the Office of Naval Research, revealed the Navy is spending about $18 million on 600 research programs in 159 universities and scientific institutions. Nearly 90 per cent of the basic research on nuclear physics in the United States is being financed by the Navy.

WAA in New Quarters

As a last move in the program of the War Assets Administration toward complete liquidation next June 30, that agency has gone into new quarters in Temporary Buildings I, J and L, located alongside the Reflecting Pool south of the Navy and Munitions buildings on Constitution avenue, Washington. In the meantime, WAA is shrinking; its personnel is already far under the peak in 1946 when the total number of employees for the country was 58,800 of whom 4600 were located in Washington. At present the WAA payroll numbers 34,600 individuals of whom some 2100 are in Washington.

Study Coking Coal Exports

While the Office of International Trade has not yet completed its study to determine what percentage of coal now being exported from this country is coking coal suitable for the iron and steel industry, indications to date are that it will be less than 10 per cent. That is, roughly, exports of coking coal are at a rate of less than 400,000 tons monthly. Furthermore, most of this coking coal is being shipped from mines that because of transportation factors do not ship to coke ovens.

A move to investigate consumption of coking coal where non-coking coal would suffice is contemplated in government circles as a forerunner to a campaign to conserve our remaining resources of coking coal. It is known that consumption of low volatile smokeless coal of coking quality is high in cities having anti-smoke ordinances—like Cincinnati, Detroit, St. Louis, etc. But how much such consumption comes to nobody has the remotest idea.

Label, Carton Design Eases Merchandising

NOTABLE progress has been made by some manufacturers in packaging and labeling industrial products. Room for improvement in these merchandising aids still exists, however. This was the consensus of 300 delegates to the joint regional sales conference of the American Supply & Machinery Manufacturers Association and the National Supply & Machinery Distributors Association in Newark, N. J., recently. The meeting was one of a series being held by the associations in various localities (STEEL, Nov. 10, p. 78).

Pricing methods based on variable lists and discounts occupied a prominent place in the discussions, with a substantial majority of distributors favoring a net pricing system. Current discount lists are out of gear with modern merchandising, declared R. H. Russell, treasurer, J. Russell & Co. Inc., Holyoke, Mass. Each transaction should pay its own way on small orders, products should be packaged in a more standard number of units, and broken packages should command high quotations, Mr. Russell said.

Packaging Lags — Packaging until recently has received far less emphasis than the stress placed on product finish and design, according to J. F. Apsey, Black & Decker Co., Baltimore, collaborating with W. W. French, director of sales promotion, Dodge Mfg. Co., in reviewing the packaging and labeling aspects of distribution. Three major functions of the package are: Carrying and protection; easy identification in the stock room; and aiding in selling, he said. He urged placing the stock or catalog number at a standard point on the package, and using improved design and color in the label.

Need for training in salesmanship was discussed by Ralph M. Johnson, vice president and general sales manager, Abrasive Division, Norton Co., and A. G. Carey, president, Rudel, Carey & Briggs Inc. Selection of salesmen through use of aptitude testing was covered by G. H. Boucher, vice president, Pyrene Mfg. Co., and R. H. Barr, manager, mill supply division, Reilly Bros. & Raub Inc. Customer coverage and market evaluation discussions were led by P. W. Evans, secretary, Beals, McCarthy & Rogers Inc., and R. P. Melius, director of sales, Delta Mfg. Co. Chairman for the meeting was W. W. Kemphert, Worthington Pump & Machinery Corp., Harrison, N. J.

SURPLUS NONFERROUS METALS PLANTS

Name and Location	Product	Designed Capacity	Acquisition Cost $000
Clifton Products Inc.,* Painesville, O.	Beryllium oxide	3,500 lb. per month	$ 286
Clifton Products Inc.,† Painesville, O.	Reclamation of beryllium copper & scrap materials to be melted, cast into ingots for sale to brass mills	100 tons per month	208
Domestic Manganese & Development Co., Butte, Mont.	Concentrating low-grade manganese carbonate ore (12%-20%) to high grade (33%-40%)	100 to 125 tons per day	297
Eagle Picher Mining & Smelting Co.,* Henryetta, Okla.	Metallic zinc	"Scrambled" operation integrated with privately-owned plant	579
Great Lakes Carbon Corp., Chicago	Calcined coke	"Scrambled" operation incapable of independent operation	469
Philadelphia Non-Ferrous Foundry Inc., Philadelphia	Nonferrous castings	Indefinite—facilities "scrambled"	42
Revere Copper & Brass Inc., Chicago	Brass strip	15,000,000 lb. per mo. (30 & 50 caliber cups)	11,058
Western Fluorspar Corp., Jackson County, Colo.	Fluorspar concentrates (metallurgical type)	20 tons of crude oil per hour	157
Manganese Ore Co., Las Vegas, Nev.	Manganese ore concentrates	9,000 long tons concentrates per month	7,637
Vanadium Corp. of America**‡ Monticello, Utah	Vanadium pentoxide	———	1,257
Total			$ 21,990

* Plant operating under interim lease
† Part of plant being used for storage under interim lease to Clifton Products. No equipment involved.
‡ Subject to national security restrictions
** Negotiations for sale at fair value practically complete

Hits Haphazard Safety Programs

A forceful industrial safety and hygiene program is vital for good labor relations and contributes heavily to a company's continuing prosperity, declared William B. Given Jr., president, American Brake Shoe Co., in a keynote address last month before the Industrial Hygiene Foundation's 12th annual meeting at the Mellon Institute in Pittsburgh.

Deploring the haphazard attitude toward this subject, Mr. Given asserted that it is a managerial function to see that hygiene departments function effectively. The departments are weak, he continued, because they are ineffectively organized, not because of any lack in knowledge of hygiene. A company's economic success is dependent in considerable measure upon the well-being of its employees, he added, but management often deals with the hygiene section as the stepchild of the organization.

Other speakers on the program included: Sumner Pike, a member of the U. S. Atomic Energy Commission, who described atomic developments to date and how industry will benefit by them as soon as they are commercially available; J. Stevens Stock, senior member of Opinion Research Corp., Princeton, N. J., who spoke on the attitude of communities toward working conditions; Dr. H. A. Vonachen, Caterpillar Tractor Co., Peoria, Ill., who described how his company carries out its hygiene program; and Dr. J. J. Wittner, assistant vice president of Consolidated Edison Co., New York, who appraised cash sickness benefit schemes.

French Loosen Reins on Prices

Elimination of subsidies on coal, iron and steel sends prices soaring. Wage increases expected. Production swings upward in September

PARIS, FRANCE

FOLLOWING numerous strikes and narrowly-averted strikes by government employees, the French government appears to be giving up its losing fight to keep wages from rising. French labor unions even now are preparing new wage demands which will take into account any price increases occurring before the demands may be made to the Cabinet.

Food prices have advanced 55 per cent in the last six months and other prices have risen 48 per cent in the same period. Index of wholesale industrial prices (1938=100) now stands at 813 and the general index for retail prices with the same base is now 1157.

Line-Holding Action Delayed — French opinion is that the Cabinet will probably let industrial prices climb to eliminate the disparity between them and food prices and then will attempt to hold both at the higher level. First move in this direction, taken to save the franc, was the recent elimination of subsidies paid on coal and iron and steel. As a result of this action, coal prices jumped from $11.25 to $18 a ton, and steel prices since Nov. 1 have soared 40 per cent higher, without any allowance being made for the higher price of coal. An additional 40 per cent increase in steel prices is expected in the not too distant future.

Prices per metric ton for representative iron and steel products as of the middle of November were as follows:

Product		Basic Bessemer	Open Hearth
Hematite pig iron	$71.40	....	....
Foundry pig iron	54.37	....	....
Semifinished steel	....	$71.40	$83.50
Rails	....	104.33	....
Merchant bars	....	98.50	111.16
Beams, structurals	....	88.50	104.33
Hoops	....	101.65	118.25
Plates	....	119.41	134.16
Medium sheets	....	124.33	141.66
Light gage sheets	....	144.00	161.66

The above prices do not include the 10 per cent purchase tax but they do include levies of 43 cents per ton for steel research, $1.25 per ton for workers' buildings and $6.66 for amortization of equipment, this aggregate amount being collected by the federation of steel manufacturers for these special purposes.

Production Increases — September saw an advance in coal output to 3,975,000 metric tons, higher than in any of the previous three months. Imports of coal also rose to a high mark of 2,037,000 tons, with 1,620,000 tons of this total being supplied by the United States. French steel output in September reached a new postwar record and, in fact, exceeded the 1938 monthly average. It is still about 10 per cent below the estimates projected in the Monnet Plan, however. Production of pig iron was also the highest in the postwar period but was only 85 per cent of the 1938 average. The French automotive industry, likewise, reached a new postwar high with production of 7284 private cars, 6512 commercial vehicles and 361 other types, making a total of 14,157 against the 1938 monthly average of 18,930.

NEXT PREMIER? Sir Stafford Cripps, who has been appointed Britain's chancellor of the exchequer, is being mentioned as possible head of a new emergency coalition government. NEA photo

Belgians Busied by Rail Plan

LIEGE, BELGIUM

STRIKES of workers in the Liege district in September disrupted steel production but deliveries for the domestic market are once again approaching normal. Demand continues far above supply, particularly in heavy plates, although there is some improvement in merchant steel, structurals and rails. The plate situation is complicated by ability of only two rolling mills to produce this material for home consumption, one of these being restricted to rolling basic bessemer material and the other, open hearth. To alleviate the critical foundry pig iron shortage an additional blast furnace will soon be blown in.

Generally speaking, Belgian export trade is favorable, despite the nonconvertibility of sterling, but Belgian exporters are closely watching British attempts to stimulate production, particularly for export. Competition from the United States is also closely followed. Foreign demand is unabating and the following steel tonnages have been allocated for export to countries with which the Belgo-Luxemburg union has trade agreements: The Netherlands, 90,000 metric tons; Sweden, 50,000 tons; Denmark, 24,000 tons; Norway, 18,000 tons; Portugal, 18,000 tons; Finland, 13,000 tons.

Railroads Modernizing — Belgian engineering works are booking a good volume of orders. For the national railroads, contracts have been placed for 50 sleeping cars, 60 freight cars and 25 automotive cars. France has placed orders for tipping cars. Complete plans for the electrification of Belgian railroads have now been formulated. This program is expected to result in the saving of 650,000 tons of coal and between $9,100,000 and $11,363,000 per year in operating costs. The total cost of the program is estimated at $363,636,363, and will benefit all Belgian industries through the orders to be placed.

The plan will electrify about 70 per cent of the Belgian rail system, with power requirements to be supplied by existing facilities; it will account for about 10 per cent of all Belgian power consumption. The first sections, Brussels to Charleroi and Schaerbeck to Antwerp, are scheduled for operation by the end of 1949; the other sections will be completed by 1951, according to present estimates. The plan provides for 600 electric locomotives of three different types.

New Vessel Launched—Hull of the new steamer *Prince Philippe* has been launched at the John Cockerill Co.

shipyards as the thirty-first vessel constructed by the company for the Ostend-Dover service. It is 372 ft long with a displacement of approximately 3230 tons.

A convention of Belgian industrialists was held recently to discuss means for improving working conditions. Several reports which were presented emphasized advisability of educating workers to their own responsibilities. While it is one of the first duties of management to take the necessary steps to insure the well-being of their workers. the reports pointed out, too often the workers themselves do not follow instructions made in their own interests.

New Canadian Steel Mill To Be Ready in February

Newly formed Vancouver Rolling Mills Ltd. plans to begin production of steel products by next February at a 12-in., six-stand mill now under construction in Vancouver, B. C., Canada. With a capacity of 20,000 tons a year, the facility will turn out small angles, channels, eye-beams, reinforcing steel, light rails and rods from ⅜ in. to 1¾ in. in diameter.

Heading the new company as president is Ronald L. Cliff.

Names Group To Study Problems Related to ERP

Appointment of a subcommittee to study problems related to the European Recovery Program has been announced by Paul G. Hoffman, president of Studebaker Corp. and chairman of the Committee for Economic Development. The subcommittee has begun work on its study and will submit its findings to the CED Research & Policy Committee, of which Raymond Rubicam, New York, is chairman.

Wayne C. Taylor, Washington, former president of the Export-Import Bank, is chairman of the new subcommittee. The other members are: Henry P. Bristol, president, Bristol-Myers Co., New York; Chester C. Davis, president, Federal Reserve Bank of St. Louis, St. Louis; Mr. Hoffman; Jay C. Hormel, chairman, Geo. A. Hormel & Co., Austin, Minn.; Thomas B. McCabe, president, Scott Paper Co., Chester, Pa.; Philip D. Reed, chairman, General Electric Co., New York; Nelson A. Rockefeller, New York; Mr. Rubicam; Beardsley Ruml, chairman, R. H. Macy & Co. Inc., New York; and J. Cameron Thomson, president, Northwest Bancorporation, Minneapolis.

Lack of Steel Stifles German Manufacturing

GERMAN manufacturers of consumer goods are finding it practically impossible to operate due to an almost complete lack of steel. Out of the 520,000 metric tons of steel allotted to the American and British zones for the last four months of this year, 90 per cent is going to the so-called basic industries such as coal mines, steelworks, transportation and public utilities. Only 500 tons have been allotted for the production of stoves and ranges, as an example, although a tremendous shortage exists.

The handicraft industries, including makers of plumbing and shoemakers supplies, are getting 14,000 tons. Statistics for the first half of 1947 show that steel production was at 21 per cent of the level for the first six months of 1936, while manufacturers operated at 31 per cent, indicating it was necessary to draw further on dwindling inventories of materials.

Car Repairs Stepped Up—One bright spot in the current picture is the progress reported by German railroads in repairing 30,000 freight cars. The new car program, however, is hampered by the lack of sheets and plates.

Importation of steel supplies under the aid-to-Europe program is believed by German businessmen to be the only salvation of the country. Many think that revival of the German steel industry should not be stressed too much.

Report $300 Million Steel District Planned in Mexico

The Mexican news agency Lania reports that a group of Mexican industrialists are planning to invest $300 million in the Tobari zone of the state of Sonora, Mexico, that will turn the district into a "small Pittsburgh."

Principal sponsors for the project which is still in the embryonic stage are Abelardo Rodriguez, former president of Mexico; Enriques Guzman, a retired general; and Ignacio Sosa, Sonora cattleman.

Brookings Begins Program In International Relations

With the publication of the first annual volume of *Major Problems of United States Foreign Policy,* the Brookings Institution, Washington, has announced the beginning of an educational program in international relations.

The first three parts of the volume analyze the main elements of the world picture as of the autumn of 1947, the principal factors in the U. S. position in world affairs, and about 60 major issues in foreign policy confronting this country. The fourth part deals in more detail with these four major problems: The German peace settlement, American assistance to Europe, the problem of China, and control of atomic energy.

BRITISH OCTOBER INGOT OUTPUT SETS RECORD

STEEL production in Great Britain reached the highest level ever attained in October, British Iron & Steel Federation reports. Output was at the annual rate of 14,316,000 tons compared with 13,841,000 tons a year in September and 13,226,000 tons in October, 1946. Pig iron production also showed an increase in October, being at an annual rate of 8,352,000 tons compared with 7,805,000 tons in September and 8,102,000 tons in October, 1946. Details of production rates are shown below.

STEEL INGOTS AND CASTINGS

	1946		1947	
	Weekly Average	Annual Rate	Weekly Average	Annual Rate
1st Quarter	242,600	12,617,000	216,000	11,231,000
2nd Quarter	252,100	13,111,000	244,100	12,694,000
3rd Quarter	230,000	11,953,000	235,400	12,241,000
September	238,500	12,402,000	266,200	13,841,000
October	254,300	13,226,000	275,300	14,316,000

PIG IRON

	1946		1947	
	Weekly Average	Annual Rate	Weekly Average	Annual Rate
1st Quarter	145,000	7,566,000	134,400	6,989,000
2nd Quarter	150,500	7,827,000	141,600	7,363,000
3rd Quarter	146,600	7,622,000	146,700	7,628,000
September	147,300	7,660,000	150,100	7,805,000
October	155,800	8,102,000	160,600	8,352,000

PEOPLE DON'T STANDARDIZE ON "SUBSTITUTES"

For nearly 15 years, molybdenum high speed steels have *proved on their own merits* that they are *superior* steels. Long before World War II, during the war, and up to the present moment, these steels have done *more* work for *less* money.

Molybdenum high speed tool steels, for instance, are not only tougher, and do more work per job, but are consistently cheaper than 18-4-1. In addition, they are from 6% to 9% less dense, so more tools may be made from the same gross weight of steel.*

Get the facts about what molybdenum high speed steels can do for you.

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MOLY

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Truck and commercial car output at record high, accounting for one fourth of total automotive production. Well more than a million units to be built this year. Many builders offering new designs

DETROIT

PASSENGER car and truck assemblies continue to pound along at a rate of close to 22,000 per day, hard on the heels of the industry's historic high, and if considered in terms of poundage the total probably would eclipse all records. Considering truck and commercial cars alone, there has never been anything like today's assembly pace, the daily aggregate being approximately 25 per cent of the total, or 5400 units. This year will see a new high registered in the truck field, both in terms of output, sales and registrations. Chevrolet reports sale of 29,461 trucks in October, highest monthly sales in the division's 35-year history.

New Designs Offered — Despite a firm demand for nearly all types of haulage units, except possibly those in the largest or so-called heavy-heavy classifications, most of the large producers either have introduced new models or are in process of doing so. Both Chevrolet and GMC Truck & Coach Division switched over to completely new designs earlier this year. They feature a considerable degree of interchangeability, particularly in cabs and bodies, which should permit greater economy of manufacture than in the past.

For the past few weeks, Ford has been in process of rearranging production equipment and retooling for a 1948 truck series which will be announced any day now. A minimum of time and employment was lost in the changeover, some crews, for example, being transferred to tractor production while truck lines were being altered.

Streamlined—As in the case of Chevrolet, GMC and doubtless Ford, the Dodge commercial units show the increasing attention being paid by designers and stylists to the esthetic—streamlining, sleek appearance, brighter colors, more ease, comfort and convenience for operators—which ten years ago probably would have drawn snorts of ridicule from prospective buyers who might have considered them too sissified for any normal truck jockey. Today, however, such things as tightly sealed cabs, good heaters, radios, more window area, better positioned and more easily operated controls are the rule rather than the exception. The truck driver has come into his own and can roll his 3-ton juggernaut along the highway with all the ease and comfort provided in the 1948 passenger car.

Many Combinations—Probably few persons realize that current truck models are built in literally thousands of combinations of chassis, cabs and cargo-carrying elements. And the trend is toward adding additional combinations—Dodge, for example, planning to offer several hundred more types. This would seem to make truck manufacturing a custom proposition, with atten[illegible] a certain extent this is true, but by precise advance scheduling of engines, frames, cabs and bodies it is possible to have the right combination come together at the proper time and at the proper point, so that assembly line may represent a different combination, if even in only minor detail such as wheel paint.

It has been estimated 1947 output of trucks and motor coaches may come to 1,400,000 units, while only a few years ago a million-truck year was considered almost the milennium. Next year the outlook is for about the same number, permitting any production increases to be concentrated in passenger cars. Conclusion is that demand for trucks will not get any stronger, and probably will taper to a mild degree, particularly in the heavier classifications.

Coach Output Up—Output of transit busses and motor coaches has moved ahead even faster than trucks, attesting to the nation-wide trend toward more and better motor coaches for municipal and interurban transportation systems. The GMC plant in Pontiac now is operating an elaborate new assembly line for motor coaches and is turning out the unheard-of total of about 700 units a month. Ford is readying an entirely new line of busses which will go into production around the first of the year. Advance talk is that they will mark a radical departure from anything Ford has yet offered in this field. A new merchandising organization has been established to push an aggressive sales program, under direction of William Livingston who for many years held a top spot in the GMC Truck and Motor Coach Division. For several months he has spent considerable time consulting on the design and styling of the new Ford coaches. Meanwhile White Motor, Mack, Twin Coach, Reo and others have been cultivating the lively bus market, with considerable degree of success.

Holiday Interruption — Thanksgiving holiday put the first crimp in assemblies experienced since the brief Chrysler shutdown over a month ago. Some plants, including Ford, used the occasion to carry out inventory operations; others, such as the GM Divisions, suspended only one day and thus lost at the most 20 per cent of the week's schedule. November operations will again see an industry total well beyond the 400,000 mark and give encouragement to prospects for the hoped-for 5,000,000-car year.

With Christmas also on Thursday this year, assemblies will fall off this month in similar fashion to last, and the possibility is seen that more companies will close down for the

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,717	84,109
March	441,798	140,738
April	449,388	248,108
May	390,629	247,620
June	418,919	216,637
July	396,932	331,100
August	360,221	359,111
September	452,068	342,969
October	460,527*	410,510
November		380,664
December		380,908
12 mos.		3,268,456

* Preliminary.

Estimates for week ended:

Nov. 8	106,651	92,760
Nov. 15	110,663	94,425
Nov. 22	111,228	96,434
Nov. 29	90,000	77,222

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TUBELESS TIRE: Akron tire builder shows the inner layer of thick gummy rubber lining of a new auto tire that requires no tube and which is self-puncture sealing. These tires have been undergoing tests by taxicabs in several cities and will be placed on the market by B. F. Goodrich this winter. NEA photo

full weekend. Earlier hints of closings for the full time between Christmas and New Year's now may prove incorrect (Dodge is one exception), since in most cases where 1948 models are being scheduled for year-end introduction, only moderate changes will be required and the first of the new series will ride the coat-tails of the last of the '47s.

Balance Approaching? — Industry observers continue to find much food for speculation in the actual firmness of the automotive retail market and the corollary sustained and unsatiated demand for materials, principally steel. Mounting sentiment leans to the belief the passenger car market may be nearer to a balance between supply and demand than any official in the automotive industry has indicated publicly. A softening in "new used" car prices on Detroit lots might be taken as a token of this fact. On the other hand, the same idea was heard a year ago and it developed the retreat of prices on late model cars was only seasonal, quotations climbing upward again by spring. It would appear that until prices on this type of merchandise have fallen to, say, $300 under factory list prices, there can be no strong support for a presumed early return of normalcy in automotive sales.

Steel Outlook—As far as steel supplies are concerned, some analysts are wondering whether the fact that they were overly optimistic early in 1946 about the nearness of balance between supply and demand might not infer an overly pessimistic outlook now. Talk of a two-year drouth in flat-rolled steel tonnage continues to be heard in many quarters; still it is difficult to swallow when consideration is given to the appreciable increases in rolling capacity scheduled to be operative this month and early in 1948, the large tonnages moving to the auto industry on ingot conversion deals, and the likelihood that steel pipelines to manufacturers of a considerable number of consumer goods are or should be filled.

Price of Newness — Initial impact of the return of a buyer's market could be expected to be felt by Kaiser-Frazer and other independents which are turning out cars far beyond the 1941 level. Perhaps this explains why K-F is stepping up its advertising program and placing every ounce of effort to push assemblies to 1000 per day, and then to 1500 late next year. Once output at Willow Run gets to even 1000 daily, some margin costwise should be available to trim prices a little, if competitive conditons justify it.

Canada Restricts Imports

Sweeping restrictions on imports of automotive vehicles and parts from the U. S. into Canada, in the effort to conserve the Dominion's dollar balances have resulted in a complete embargo on shipments of Chrysler convertibles and eights, Buick, Cadillac, Oldsmobile 98, Lincoln, Studebaker, Hudson, Packard, Nash, Kaiser, Frazer and Willys, although the possibility is seen some resumption may be permitted in a couple of months under an import quota system. Passenger cars assembled in Canadian plants, in part from parts furnished by U. S. sources, include Ford, Mercury, Plymouth, Dodge, DeSoto, Chrysler 6, Chevrolet, Pontiac and Olds 60 and 70. However, excise taxes on these makes have been hiked to 25 per cent of the first $1200 of the manufacturer's price, 50 per cent on prices from $1200 to $2000 and 75 per cent on higher figures. This compares to a former Canadian excise tax of 10 per cent.

Canada imported about 4000 passenger cars in September, 1½ per cent of U. S. production, and this share now will be divided among countries still open to American products, of which only Cuba, South Africa and larger countries of South America remain and some of these may soon close the lid.

Canadian production of cars and trucks this year probably will run to about 250,000 units and this rate could be cut sharply by restrictions on the import of parts and subassemblies from the U. S. This would result in inevitable unemployment in Canadian assembly plants, unless manufacturers here completely integrated them, a move considered nearly impossible, and probably would lead to an extension of the black market in U. S. cars there. Restrictive actions of many countries in closing off American imports will likely more than cancel out any benefits accruing from lowered international tariffs to go into effect Jan. 1.

Broadens Insurance Plan

Substantial improvements in its 21-year old group insurance plan have been announced by General Motors, effective Feb. 1, 1948. Eligible hourly rated and salaried employees will retain a portion of their insurance after age 65 and no contributions will be required thenceforth, and any employee who may have to leave GM after age 60 and who meets service requirements is permitted to continue part of his life insurance until death. Additional benefits are payable for death from accidental cause, and for certain severe nonfatal accidents, on or off the job, which may amount to as much as 50 per cent of the employee's life insurance. Another new feature provides a monthly income for a specified period for longer service employees who are totally and permanently disabled. The corporation will contribute to all of the net cost of the plan over and above the amount contributed by employees and will also pay the entire cost of administration.

WHY ARE ZINC DIE CASTINGS THE MOST WIDELY USED?

The die casting process offers the least expensive method of making a very large variety of complex metal parts. Alloys based on several different metals are employed for die castings, but zinc has for many years been the most widely used. The answer is simple—the *zinc alloys provide the greatest number of desirable mechanical properties and casting characteristics at the lowest cost.* Future advertisements will discuss these advantages individually, to give you a better understanding of just what zinc die castings can do for you.

THE ANSWER IS HERE

SELECTION FACTORS		ZINC ALLOYS	ALUMINUM ALLOYS	MAGNESIUM ALLOYS
MECHANICAL PROPERTIES	Tensile Strength	1 (strongest)	2	3
	Impact Strength	1 (toughest)	2	1
	Elongation	1 (most ductile)	2	2
	Dimensional Stability	2	(1 most stable)	2
	Resistance to Cold Flow	2	1	1
	Brinell Hardness	1 (hardest)	2	2
PHYSICAL CONSTANTS	Electrical Conductivity	2	1 (highest)	3
	Thermal Conductivity	2	1 (highest)	3
	Melting Point‖	1 (lowest)	2	2
	Weight, per cu. in.	3	2	1 (lightest)
CASTING CHARACTERISTICS	Ease, Speed of Casting	1 (easiest)	2	2
	Maximum Feasible Size	1 (greatest)	2	3
	Complexity of Shape	1 (most complex)	2	3
	Dimensional Accuracy	1 (most accurate)	2	2
	Minimum Section Thickness	1 (thinnest)	2	2
	Surface Smoothness	1 (smoothest)	2	2
COST	Die Cost†	1 (lowest)	2	2
	Production Cost	1 (lowest)	2	2
	Machining Cost	1	2	1
	Finishing Cost‡	1 (lowest)	2	2
	Cost per Piece§	1 (lowest)	2	2
EXTENT OF USE		1 (most used)	2	3

‖ A low melting point is favorable in reducing die cost and upkeep and facilitates casting.
† Dies for casting the low melting point alloys are least expensive and have longest life.
‡ Includes polishing and buffing expense as well as ease of applying all types of commercial finishes, both electrodeposited and organic.
§ Based on die and fuel costs, production speed and machining and finishing costs.

Ask your die casting source for our booklets covering all phases of the die casting process—properties, design, machining, finishing—or write directly to us.

You probably know the zinc die casting alloys by the trade name, Zamak. The New Jersey Zinc Company developed alloys of specific compositions for the die casting industry and gave them this name. Zinc alloys of these compositions are the only ones used for die casting. Your die caster exercises careful control in the formulation of these alloys to assure maximum mechanical properties and dimensional stability.

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FOR DIE CASTING ALLOYS

THE NEW JERSEY ZINC COMPANY, 160 Front St., New York 7, N. Y.

The Research was done, the Alloys were developed, and most Die Castings are based on
HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

Westinghouse Production at Record High

WESTINGHOUSE Electric Corp.'s production in October shattered all peacetime records despite continuing materials shortages and transportation difficulties, according to Gwilym A. Price, president.

An equivalent of 5835 average size freight cars were required to ship this single month's output which ranged from turbine generators to electric light bulbs. Westinghouse employment in October also reached a new peacetime high of 105,574, Mr. Price revealed, compared with 76,918 for the highest prewar level in November, 1941. Employment in September, 1947, totaled 104,552.

The company's largest manufacturing operation, at East Pittsburgh, Pa., turned out 1486 carloads of large electrical equipment such as turbine generators, switchgears and large motors during the month. East Pittsburgh shipped seven generators with a combined capacity for supplying 240,000 kilowatts of electric power, the largest number of these units ever delivered by the company in a single month. Steam turbines to drive generators accounted for most of the 276 carloads of equipment that left Westinghouse plants at South Philadelphia, Pa.

Buffalo Shipments Up—From Buffalo the company's new Motor Division plant shipped 371 carloads of motors for use on machine tools. Shipments from this plant in October, 1946, totaled only 75 carloads. The corporation's Bryant Electric plant at Bridgeport, Conn., also surpassed previous records, with 20 carloads of small electrical devices dispatched from the facility.

Six of the Westinghouse divisions shipped a larger physical volume of products in October than in any previous month, including even the war period. These were the Transformer Division, Sharon, Pa.; Meter Division, Newark, N. J.; Small Motor Division, Lima, O.; Lamp Division with its principal plants in Bloomfield, Trenton, and Belleville, N. J., and Fairmont, W. Va.; Electric Appliance Division with facilities at Springfield, Mass., and Mansfield, O.; and the Manufacturing & Repair Division which has 36 plants in 25 states.

Appliance Output Doubles—Shipments of home appliances totaled 1263 carloads in October, compared with a typical prewar monthly shipment of 698 cars in 1941. Refrigerators, ranges and laundromats accounted for most of this production. The Home Radio Division in Sunbury, Pa., also achieved its greatest peacetime output with 32 carloads of receivers shipped in October.

Pittsburgh Buys Blast Furnace at Monessen, Pa.

Pittsburgh Steel Co., Pittsburgh, has purchased from War Assets Administration, the incomplete blast furnace at Monessen, Pa., for $2,126,000. Included with the furnace in the sale is one of two turboblowers located at the government's Cleveland blast furnace. This blower will be removed by Pittsburgh and installed at the Monessen site.

Monessen furnace has a capacity of 450,000 tons of pig iron per year, according to the WAA announcement. Pittsburgh proposes to complete the furnace at an additional cost of approximately $1,300,000 and hopes to begin new pig iron production at the facility by next May.

WAA said that with full operation of this furnace along with production from two others already owned by Pittsburgh, the company expects to have from 18,000 to 20,000 tons of basic iron available each month for sale to other manufacturers.

70 FOR JEFFREY

Celebration of the company's 70th anniversary this year finds the employees of the Jeffrey Mfg. Co., Columbus, O., also celebrating an unusual record. Six hundred and eighty-five workers, approximately a quarter of the total personnel, have been with the company more than 20 years. This impressive total includes 15 employees serving over 50 years, 82 serving over 40 years and 340 with over 30 years' service. The "20 year" club holds a banquet each year. Jeffrey makes coal mining equipment, electric locomotives, chains and conveying and crushing machinery.

EXHIBITS NEW LINE: Norton Co. showed its new line of grinding and lapping machines at an open house for employees, their families and friends. All the company's machines exhibited at the National Machine Tool Show at Chicago in September were shown in operation, as well as a number of new machines

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

All American Industries Inc., New York, has changed its name to American Steel & Pump Corp. as a more descriptive title for the present activities of the corporation and its subsidiaries, Oklahoma Steel Casting Co. Inc., FitzSimons Steel Co. and A. D. Cook Inc.

—o—

Reps Tool Co. Inc., manufacturer of pipe and stud extractors, has moved from New York to 94 Allyn St., Hartford, Conn.

—o—

Aircraft Screw Products Co. Inc., Long Island City, N. Y., maker of screw thread inserts, has changed its name to Heli-Coil Corp. effective Jan. 1. There will be no change in management, personnel or address.

—o—

Morrison Engineering Corp., Cleveland, maker of flash bakers, core ovens and finishing equipment, expects total orders on its books will reach the $500,000 mark in the next 12 months.

—o—

Ward Leonard Electric Co., Mt. Vernon, New York, manufacturer of electric controls, has established a sales office at 37 Webster St., Hartford, Conn., with C. F. Shea as district manager.

—o—

Maytag Co., Newton, Iowa, recently produced its five millionth washing machine.

—o—

American Society of Mechanical Engineers, New York, announces that the first issue of *Applied Mechanics Reviews,* a new monthly devoted to reviewing current literature in applied mechanics, will appear next January. Co-sponsors are the ASME, Engineering Foundation, Illinois Institute of Technology and other organizations.

—o—

V. & E. Mfg. Co., maker of drafting machines and drawing instruments, has moved into its new facilities at 766 S. Fair Oaks Ave., Pasadena, Calif.

—o—

Vacuum Cleaner Manufacturer's Association, Cleveland, reports 359,040 standard-size vacuum cleaners were produced in October, an all-time high.

—o—

Arter Grinding Machine Co., Worcester, Mass., has purchased from Grenby Mfg. Co., Plainville, Conn., the right to manufacture and sell the line of cylindrical and internal grinders previously made by that firm.

—o—

Monroe Auto Equipment Co., Monroe, Mich., has announced reductions in its truck seat prices ranging up to 41 per cent.

—o—

Reliance Electric & Engineering Co., Cleveland, maker of electric motors, recently held an open house at its Ashtabula, O., plant which was attended by 5000.

—o—

Production Metal Products Co. has moved its nonferrous foundry to 6069 Maywood Ave., Huntington Park, Calif., in an expansion program in which the firm has acquired a total of 10,000 sq ft of floor area.

—o—

American Agile Corp., Cleveland, manufacturer of welding electrodes, has appointed Industrial Engineering & Sales Co., Pittsburgh, as its sales agent in western Pennsylvania.

—o—

North American Aviation Inc., Los Angeles, has leased five units of the government-owned Douglas Aircraft Co. Inc. plant at Long Beach, Calif. Lease is for five years at an annual rental of $226,580.

—o—

Yoder Die Casting Inc., Dayton, O., has opened an addition to its aluminum and die casting facilities at 727 Kiser St., Dayton.

—o—

Rust Furnace Co., Pittsburgh, has received an order from Benjamin F. Shaw Co. at Wilmington, Del., for a car-type annealing furnace for the heat treatment of fabricated pipe. Contract price is about $60,000.

—o—

Sperry Products Inc., manufacturer of testing and measuring instruments, will move its manufacturing plant and general offices from Hoboken, N. J., to Danbury, Conn., during the summer of 1948. A 20-acre site has been acquired and construction of a plant will begin immediately.

—o—

American Chemical Society, New York, announces an award of $1000 for outstanding achievement in analytical chemistry has been established by C. G. Fisher, president of Fisher Scientific Co., Pittsburgh.

—o—

Manhattan Rubber Division, Raybestos-Manhattan Inc., Passaic, N. J., maker of rubber and asbestos articles, recently held its third annual dinner for foremen, supervisors, officials and their wives which was attended by approximately 400.

—o—

Chamber of Commerce of the United States, Washington, reports that its Foreign Commerce Department has published a booklet, *Doing Import and Export Business,* which discusses the principles, practices, techniques and problems of importing and exporting.

—o—

Dravo Corp., Pittsburgh, has received an order from the Argentine government for ten welded steel sand and gravel barges. The vessels will be fabricated at Neville Island, Pittsburgh, and shipped "knocked down" to Buenos Aires.

—o—

Standard Tube Co., Detroit, maker of welded and stainless formed tubing, has appointed Industrial Products Sales Co., Akron, as its representative for Ohio.

—o—

Economy Pumps Inc., Hamilton, O., manufacturer of pumps and pumping machinery, has acquired from WAA the addition to its plant built by Defense Plant Corp. for $705,000 in 1942. Facility will house both of Economy's subsidiaries, Liberty Planers Inc. and Klipfel Mfg. Co.

—o—

Hagan Corp., Pittsburgh, combustion and chemical engineering firm, has appointed Maintenance Engineering Corp., Houston, Tex., to represent it in Mexico.

—o—

Bureau of Mines reports that experimental work just completed in a pilot plant in Grand Forks, N. D., shows that more than 900 billion tons of lignite in three Western states is a potential source of fuel gas for beneficiating iron ore, making hydrogen and other uses.

—o—

War Assets Administration is offering 4,500,000 pounds of ferrous metals costing the government $355,000 at fixed prices in sales beginning Dec. 1 at East Chicago, Ind. Items include alloy and carbon rounds, strips, sheets, flats, wire, tubing, and stainless sheets and shapes.

—o—

Bethlehem Steel Co., Bethlehem, Pa., has purchased from WAA for $500,000 a shell-casings plant in Johnstown, Pa., which it operated during the war. Bethlehem will use the facility to fabricate railroad car frames, mine cars, road mats, steel joists and other products.

The Business Trend

OPERATIONS in the nation's factories in the week ended Nov. 22 continued at the precedent-setting pace achieved in three of the previous four weeks. STEEL's index of industrial production stood at 168 per cent of the 1936-39 average. Seasonal influences, beginning now to be reflected in railroad freight carloadings, are compensated for by the strong showings made by the steel, electric power generating and automotive industries.

AUTOS—Production of 111,228 cars and trucks in the United States and Canada set a new postwar record in the week ended Nov. 22, besting the previous high attained in the preceding week by 565 units. This turn-out, achieved despite abnormally high absenteeism because of the beginning of the deer hunting season and disruption of Ford's truck production because of model changeovers, brought this year's cumulative production to 4,472,548 units.

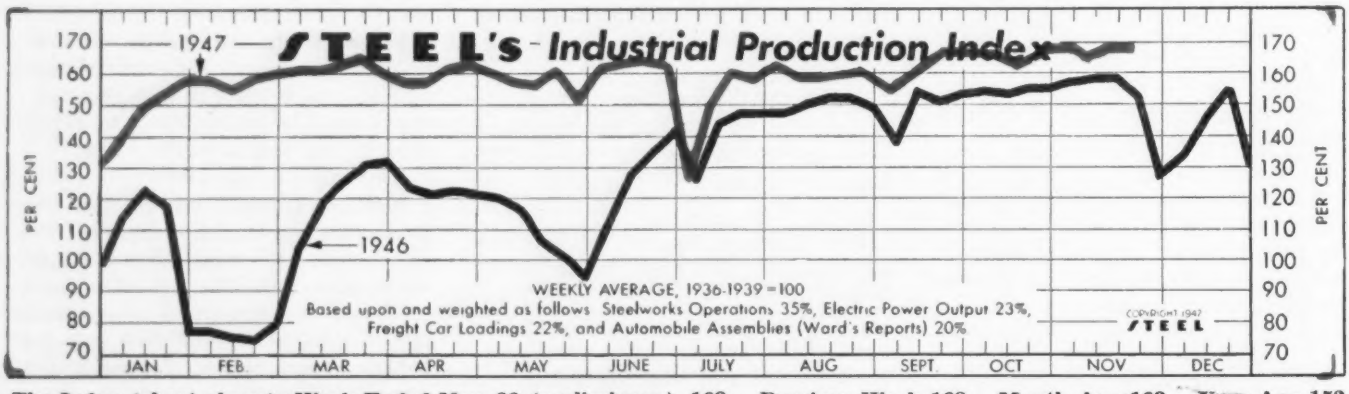
RAILROADS—Freight car loadings for the first ten months of this year were 7.6 per cent above those for the comparable period of last year, Office of Defense Transportation announces. This year's loadings are 5.3 per cent above those for the like period of 1945, 1.8 per cent above 1944 and 4.6 per cent above 1943, the agency adds. Coal loadings during the ten-month period this year were 10.4 per cent higher than in the like period of 1946, and grain showed a 12 per cent gain. Railroad operating revenues, according to estimates of the Association of American Railroads, increased 10.8 per cent in October compared with October, 1946, revenue from freight showing a 16.3 per cent gain between the two months.

COAL—Production of bituminous coal from Jan. 1 through Nov. 15 was approximately 538,085,000 tons, the National Coal Association reports. Although current production is slightly below that for the comparable week a year ago, cumulative output this year is 12.2 per cent above that for the like period of 1946.

BUYING—Consumer purchases of all commodities rose in October to within 0.4 per cent of the all-time high of July, 1947, and the seasonally adjusted consumer buying index of Dun & Bradstreet Inc. stood at 280.4 per cent of the 1935-1939 average, 12.4 per cent above the figure for October, 1946.

BUSINESS—Gains in volume of new orders and inventories spurred production and employment in October to more than seasonal gains, Department of Commerce announces. During September, the department says, business inventories were increased $1 billion and ordering gained 11 per cent over the previous month. This latter increase was the largest for any month this year.

PRICES—Postwar high of wholesale prices for all commodities was reached in the week ended Nov. 15 when the Bureau of Labor Statistics index rose 0.4 per cent to 158.5 per cent of the 1926 average. This was 16.7 per cent above the index of Nov. 16, 1946, and 40.6 per cent higher than at the end of June, 1946.



The Index (chart above): Week Ended Nov. 22 (preliminary) 168 Previous Week 168 Month Ago 168 Year Ago 152

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	96.5	97.0	95.5	83.0
Electric Power Distributed (million kilowatt hours)	5,095‡	5,084	4,964	4,765
Bituminous Coal Production (daily av.—1000 tons)	2,098	2,139	2,102	2,107
Petroleum Production (daily av.—1000 bbl.)	5,265‡	5,257	5,295	4,810
Construction Volume (ENR—Unit $1,000,000)	$100.9	$159.3	$141.7	$77.8
Automobile and Truck Output (Ward's—number units)	111,228	110,663	106,159	96,454

* Dates on request. ‡ Preliminary. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

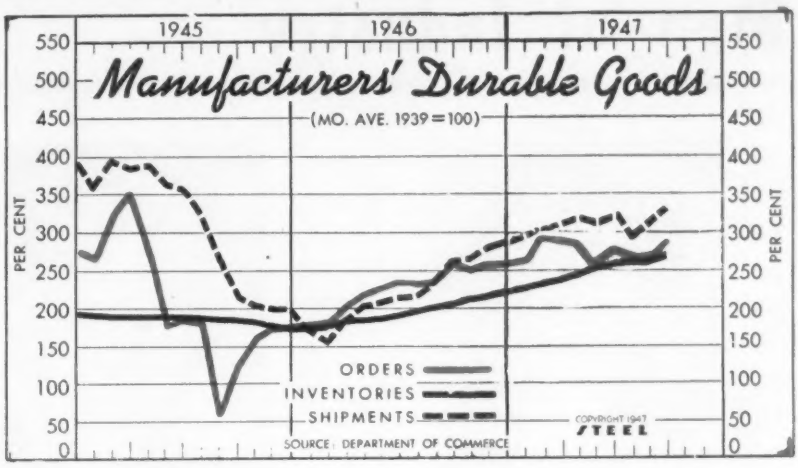
TRADE				
Freight Carloadings (unit—1000 cars)	865†	878	955	807
Business Failures (Dun & Bradstreet, number)	80†	84	81	24
Money in Circulation (in millions of dollars)‡	$28,595	$28,709	$28,569	$28,689
Department Store Sales (change from like wk. a yr. ago)‡	+11%	+10%	+1%	+24%

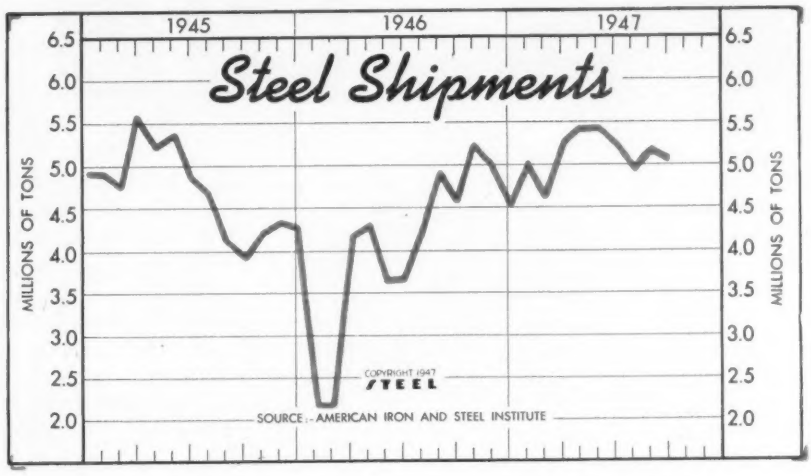
† Preliminary. ‡ Federal Reserve Board.

Index of Manufacturers' Durable Goods

(Mo. Ave. 1939=100)

	Orders		Shipments		Inventories	
	1947	1946	1947	1946	1947	1946
Jan.	270	176	292	169	226	171
Feb.	295	179	311	153	232	174
Mar.	288	203	312	183	238	181
Apr.	279	219	320	203	244	182
May	256	224	313	207	251	184
June ...	270	231	323	212	254	189
July	260	229	287	216	256	195
Aug.	260	232	301	233	259	200
Sept.	287	254	332	259	263	206
Oct.	...	248	...	262	...	211
Nov.	...	254	...	278	...	215
Dec.	...	271	...	292	...	220
Ave. ..	...	227	...	222	...	194





Steel Shipments

(Net Tons)

	1947	1946	1945
Jan.	5,061,333	2,189,369*	4,940,160
Feb.	4,626,424	2,189,368*	4,776,377
Mar.	5,304,415	4,213,913	5,632,155
Apr.	5,445,993	4,335,694	5,254,064
May	5,442,343	3,666,677	5,417,051
June	5,263,711	3,687,509	4,891,228
July	4,974,566	4,259,494	4,696,895
Aug.	5,278,223	4,965,456	4,123,578
Sept. ...	5,118,839	4,589,902	3,955,198
Oct.	.....	5,260,832	4,267,177
Nov.	.....	5,019,984	4,366,567
Dec.	.....	4,533,420	4,297,502

* Figures for January and February, 1946, are merely averages derived from a report that combined shipments for those two strike-affected months into a total of 4,378,737.

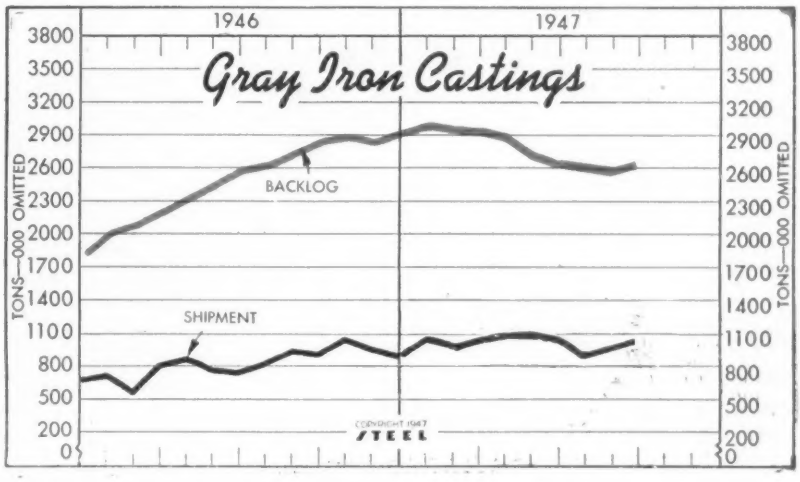
Gray Iron Castings

(U. S. Bureau of Census)

Tons—000 omitted

	Shipments		Backlogs*	
	1947	1946	1947	1946
Jan.	1,078	727	3,021	2,096
Feb.	1,010	572	2,987	2,182
Mar.	1,090	820	2,979	2,285
Apr.	1,097	886	2,908	2,430
May	1,097	783	2,783	2,531
June	1,038	757	2,711	2,640
July	913	840	2,675	2,708
Aug.	952	973	2,631	2,814
Sept.	1,025	937	2,680	2,897
Oct.	....	1,078	....	2,953
Nov.	....	987	....	2,940
Dec.	....	909	....	2,980
Mo. Ave. ..	....	856	....	2,621

* Unfilled orders for sale to the trade.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$15,858	$11,419	$15,020	$13,872
Federal Gross Debt (billions)	$258.4	$258.6	$259.1	$262.2
Bond Volume, NYSE (millions)	$25.7	$20.7	$26.2	$23.0
Stocks Sales, NYSE (thousands)	4,990	3,486	7,677	5,862
Loans and Investments (billions)†	$64.9	$64.9	$64.6	$57.5
United States Gov't. Obligations Held (millions)†	$37,834	$37,982	$38,103	$37,626

† Member banks, Federal Reserve System.

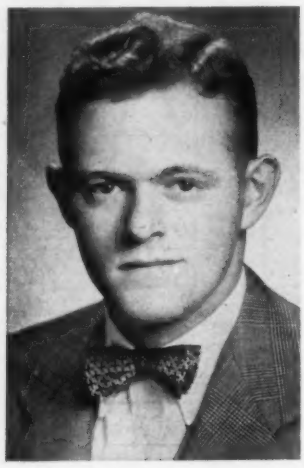
PRICES

STEEL's composite finished steel price average	$76.09	$76.09	$75.41	$64.45
All Commodities†	158.5	157.9	157.9	135.8
Industrial Raw Materials†	175.8	175.2	176.0	152.6
Manufactured Products†	151.7	151.0	151.1	130.4

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

NORTON P. BOSEMER



ROBERT S. TYLER JR.

G. W. HOFSTETTER

Two promotions have been announced by the Welding Fittings Division, Tube Turns Inc., Louisville. **Norton P. Bosemer** has been placed in charge of the Los Angeles office, and **Robert S. Tyler Jr.** has been placed in charge of a newly established mid-continent district, with headquarters at Tulsa, Okla. Mr. Bosemer joined Tube Turns' sales staff in 1937, and was assigned to the San Francisco office in 1944. Mr. Tyler became associated with Tube Turns in 1946, after four years of service with the Navy. He is a graduate of the company's sales training project.

—o—

Harry D. Myers has been appointed executive vice president, director and general manager of the eight plants of Standard Products Co., Detroit. He had been vice president in charge of production, and director with Harry Ferguson Inc., Detroit, and previously had been director of purchases, Thompson Products Inc., Cleveland.

—o—

James C. Esterline has recently been appointed general manager of the L. G. S. Spring Clutch Corp., subsidiary of Curtiss-Wright Corp., at Indianapolis. He formerly had been affiliated with the American Blower Corp., where he served for 10 years in sales and engineering capacities, and recently had held the position of manager of the Columbus, O., plant for that company.

—o—

Thomas G. Carey has been promoted to the position of purchasing agent of production parts and subcontracting, Weatherhead Co., Cleveland. He has been associated with that company for the past two years in its production section, and previously held an administrative position with the Chicago Ordnance District of the War Department.

—o—

Arter Grinding Machine Co., Worcester, Mass., has appointed **E. S. Drowne Jr.** as its exclusive selling agent in Maine, New Hampshire, Vermont, Massachusetts and Rhode Island for its line of rotary surface, cylindrical, and internal grinders.

—o—

Great Lakes Supply Corp., Chicago, announces appointment of **W. G. Ritzenthaler** as president and treasurer, and **L. R. Niep** as vice president of the corporation.

—o—

Raymond W. Drake has been appointed manager of sales, Wilkes-Barre sales office of the American Steel & Wire Co., Cleveland, a U. S. Steel Corp. subsidiary. He has been connected with the company for 10 years. As manager of sales at Wilkes-Barre, Mr. Drake succeeds **Bruce D. Bennett,** who has been transferred to Chicago as manager of electrical wire rope and construction materials sales.

—o—

George A. Kelly has been appointed president of G. A. Kelly Plow Co., Longview, Tex., succeeding his father **R. M. Kelly,** now chairman of the board of directors.

—o—

Election of **Walker H. Nye,** Cleveland attorney, as a director of the Austin Co., Cleveland engineers and builders, has been announced by the company. He succeeds the late **W. B. Stewart,** who had been a director and general counsel of the company since its incorporation. **Mr. Nye,** since 1928 a partner of the late Mr. Stewart in the law firm of McKeehan, Merrick, Arter & Stewart, has been closely identified with the Austin Co. for more than 20 years. In 1941 he was made responsible for the handling of general legal matters in connection with Austin's wartime operations.

—o—

Ferro Enamel Corp., Cleveland, announces the opening of new offices located at 336-338 N. Central Ave., Chicago. **G. W. Hofstetter,** midwest sales and service manager, will make his headquarters at the new location.

—o—

W. E. Odom and **J. E. Nyhan,** employer association executives and independent operators in the field of industrial relations, have entered into partnership to continue as consulting industrial engineers. Mr. Nyhan spent nearly 12 years as assistant to the president, National Founders Association, and as national secretary of National Metal Trades Association. Mr. Odom is one of the founders of the Association of Professional Engineers, past president of the Industrial Management Society, and the founder and manager of William Odom Associates.

—o—

Raymond J. Southwell, sales manager of the Campbell Division, American Chain & Cable Co. Inc., Bridgeport, Conn., has resigned his position with that company to devote his time to a new process for the manufacture of wire fabrics which he has developed. Before joining American Chain & Cable Co., Mr. Southwell spent many years in the manufacture and sales of wire fabrics. He formerly had been vice president of Clinton

Assembly Costs Slashed 25%

64 SPEED NUTS on each "Electro" Cigarette Vending Machine *Boost* Production and *Reduce* Assembly Costs.

Push-on type SPEED NUTS are used over die cast studs as shown at left, to attach medallion and delivery compartment bezel, and for other fastening jobs not visible in photo. C7000 flat type SPEED NUTS are used to attach hinges to top cover, bottom frame and doors.

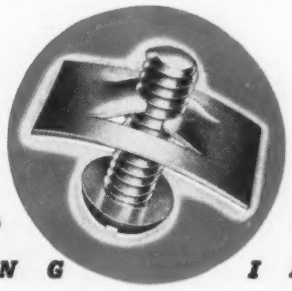
Mr. M. Caruso, President of C-Eight Laboratories, Newark, New Jersey, has this to say about SPEED NUTS:

"Further experiments increased the use of SPEED NUTS in assembling our "Electro" All-Electrical Cigarette Vending Machine. Since this change over, a study of our costs reveals a *saving up to 25%*. We feel sure that more and more Tinnerman fasteners will be used on our equipment and will set a standard of quality and perfection for the ultimate user."

We're sure we can help you produce a better product at lower cost. Write us about your assembly problem today.

TINNERMAN PRODUCTS, INC. • 2039 Fulton Road, Cleveland 13, Ohio

In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In England: Simmonds Aerocessories, Ltd., London
In France: Aerocessoires Simmonds, S.A., Paris
In Australia: Simmonds Aerocessories, Pty. Ltd., Melbourne



Speed Nuts* PATENTED Trade Mark Reg. U. S. Pat. Off.

MORE THAN 4000 SHAPES AND SIZES

FASTEST THING IN FASTENINGS

Wire Cloth Co., and American Wire Fabrics Co., both of which were part of Wickwire Spencer Steel Co., New York.

—o—

Charles F. Devereaux and **C. G. Miller** have been appointed managers of the Washington and Philadelphia zones, respectively, for Pontiac Motor Division, General Motors Corp. Mr. Devereaux, formerly assistant manager at Buffalo, succeeds **R. O. Nenke,** who has resigned to become a Pontiac dealer at Bethesda, Md. Mr. Miller, formerly assistant manager at New York, succeeds **G. M. Powers Jr.,** who has taken over a Pontiac dealership at Taunton, Mass.

—o—

Karl M. Greiner has been appointed general sales manager, Packard Motor Car Co., Detroit, succeeding **Lyman W. Slack,** who has resigned as director, vice president and general sales manager. Mr. Greiner has been parts and service manager since 1943. Mr. Slack joined Packard in 1943 as a sales promotion manager, and became general sales manager in 1943, a vice president in 1945, and a director last May.

—o—

Roy H. Warmee has been appointed sales manager of the Moduflow Division, Minneapolis-Honeywell Regulator Co., Minneapolis. He has been sales promotion manager since 1940.

—o—

Otis H. Wright has joined the Fulton Engineering Co., Cleveland, in partnership with **E. C. Neithamer.** Mr. Wright will set up a new structural department, and Mr. Neithamer will continue to handle the Mechanical Division.

—o—

Henry P. Nelson has been appointed president of Menasco Mfg. Co., Burbank, Calif. He has been associated with the company since 1945, serving as vice president since Aug. 15. He previously had been the company's eastern manager with headquarters in Washington. Mr. Nelson served during the war with the War Production Board in various wartime capacities, and had been head of its Aircraft Division.

—o—

Western Gear Works and Pacific Gear & Tool Works, Seattle, announce the appointment of West-Marquis Inc. to serve as their advertising agency. The Western Gear Works plant in Seattle and Los Angeles, and the Pacific Gear & Tool Works plant in San Francisco, will be serviced by the West-Marquis offices in those cities. **Glenn W. Malme,** sales promotion manager of the companies, is in charge of Pacific-Western's advertising activities. **Donald McKenzie,** of the agency's Los Angeles office, will serve as account executive.

—o—

W. E. Rutz, vice president, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has been re-elected a director of the Wisconsin State Chamber of Commerce.

—o—

The Lauson Co., New Holstein, Wis., a division of Hart-Carter Co., Peoria, Ill., announces the election of **H. E. Bruns** as president and general manager of the company, succeeding **E. A. Longenecker,** who has resigned to accept the position of president and general manager of the LeRoi Co., Milwaukee. **R. H. Bader,** formerly purchasing agent and production manager, has been named to succeed Mr. Bruns as secretary-treasurer of the Lauson Co.

—o—

Walter B. St. John, formerly general sales manager, Piper Aircraft Corp., Little Rock, Pa., has been appointed sales manager of the Personal Planes Division, Fairchild Engine & Airplane Corp., New York.

—o—

Harry G. Ferguson has been elected president of Harry Ferguson Inc., Detroit, succeeding **Roger M. Kyes,** who has resigned as director, president and general manager.

—o—

M. C. Miller has been named manager of sales promotion and sales training, Norge Division, Borg-Warner Corp., Chicago. Mr. Miller, who has been in the appliance field for 20 years, has just been released by the Navy.

—o—

E. L. Ramsey, who retired recently as superintendent of steel production, Wisconsin Steel Co., subsidiary of International Harvester Co., Chicago, has resumed active work in the steel industry as a technical consultant with Miller & Co., Chicago.

A. S. TERRY

Appointed sales manager of Bellows Co., Akron. Noted in STEEL, Nov. 24 issue, p. 74

—o—

Reeve Hoover, Washington, has been named chairman of the board of Commercialores Inc., New York, which was established last March by a private group for the purpose of developing a large kyanite deposit in South Carolina—a silicate of alumina used in super-duty refractories and in other branches of the ceramic industry.

—o—

James T. Sneveley, assistant enamel superintendent, Florence Stove Co., Kankakee, Ill., has been appointed superintendent of the enameling department of the Conlon-Moore Corp., Moore Division, Joliet, Ill. **Robert West,** formerly in charge of the St. Louis territory as district sales manager for the Conlon Division of Conlon-Moore Corp., has been made direct factory representative of the company in Illinois and eastern Missouri.

—o—

Andrew J. Martin has been appointed supervising engineer of the Metal Economics Division's Denver office, succeeding the late **George E. Woodard.** Associated with the Bureau of Mines for nearly 24 years, Mr. Martin has been engaged during most of the period on studies of the economics and statistics of the mineral industries.

—o—

Gen. Robert M. Littlejohn has resigned as administrator of the War Assets Administration.

—o—

Eugene A. Lindemann, president, A. J. Lindemann & Hoverson Co., Milwaukee, has been elected a director of Ampco Metal Inc., Milwaukee. He succeeds the late **Samuel L. Schefrin.**

—o—

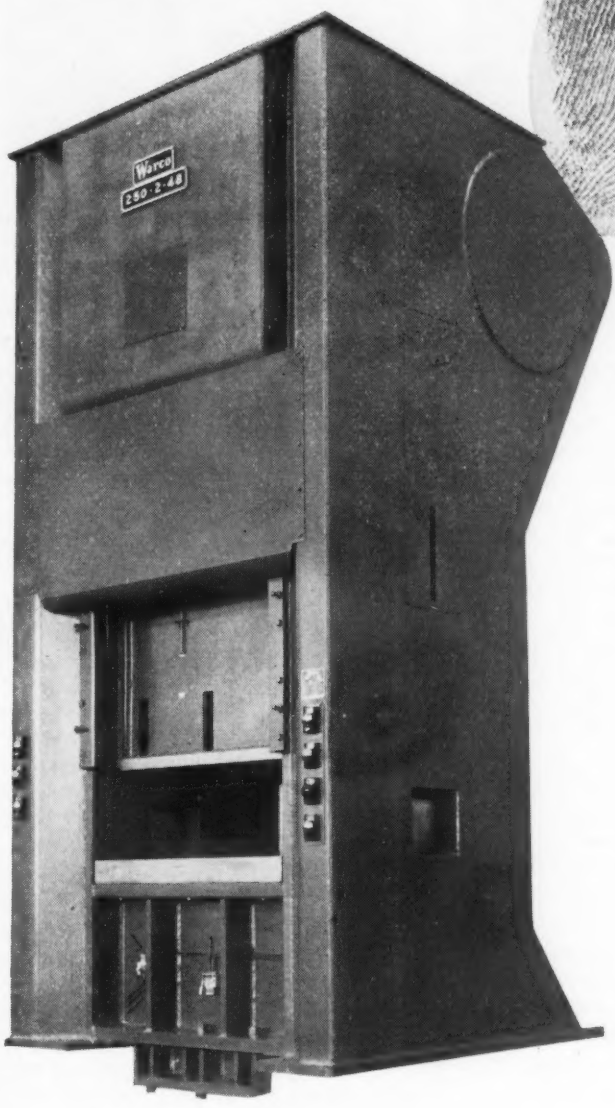
The Philadelphia Chapter, Institute of Scrap Iron & Steel Inc., has re-elected the following officers: President, **John T. Hunt,** M. J. Hunt's Sons; and vice president, **Harry Stave,** Stave Bros., both of Philadelphia. Treasurer, **D. J. Giordano,** Giordano Iron & Metal Co., Camden, N. J., and secretary, **Marcus J. Margulies,** Luria Steel & Trading Corp., Philadelphia.

—o—

The Western Chapter, Institute of Scrap Iron & Steel Inc., has elected the following officers: **D. Sloan Hurwitz,** Buffalo, president; **Her-**

POSITIVE
as a fingerprint

Warco PRESSES



WARCO 250-Ton Two Point Eccentric Gear Press. Distance between housings 48 inches. All-welded steel construction. WARCO friction clutch, electrical push button control.

A fingerprint is the most positive means of identification known, and, likewise, the WARCO trademark is equally positive in identifying the finest presses known.

The complete line of WARCO presses — ranging in capacity from 50 tons up — is of *fully stress-relieved all-steel welded construction.* The rigid non-deflecting frames increase life of expensive dies. WARCO close-tolerance specifications reduce vibration, wear and noise.

There is a modern WARCO press for quantity production of all stampings at lower per unit cost.

Our skilled and experienced engineers will be pleased to work with you on your press problems. Write today for further information, or, better still, arrange to visit our modern plant, the largest of its kind in the world.

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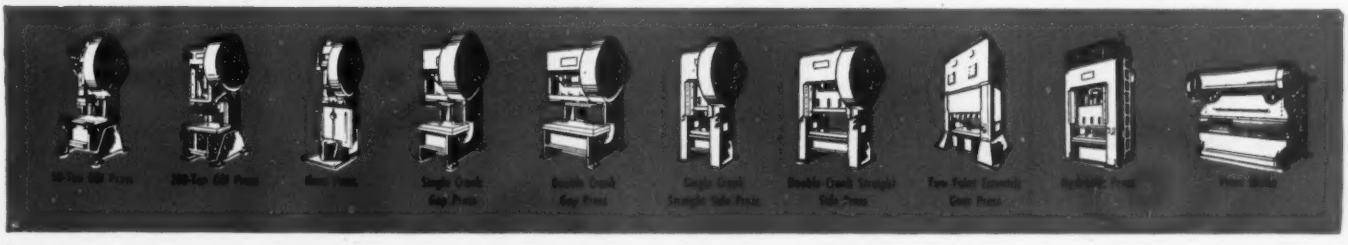
4127 GRISWOLD ST., WARREN, OHIO
A Subsidiary of The Federal Machine and Welder Company
Offices in Principal Cities



man Schwartz, Rochester, vice president; and **Leo Chapin,** Buffalo, secretary-treasurer.

—o—

W. T. Peterson, who recently resigned as central zone manager of Ampco Metal Inc., Milwaukee, has formed his own sales-engineering organization, known as the W. T. Peterson Co., located at Ferndale, Mich.

—o—

Appointment of **Thomas E. Deans** as regional director of the Minneapolis Division has been announced by Glidden Co., Cleveland. He joined the Glidden Co. in 1925. He recently was sales manager for the St. Louis Division.

—o—

Douglas P. Waterhouse has been appointed northeastern district representative for accessory equipment, Accessory Equipment & Wiring Device Divisions, General Electric Co., Schenectady, N. Y.

—o—

Attorney **George V. Woodling** has been named vice president, International Electronics Corp., Cleveland, a recently incorporated firm engaged in research work on radio electronics.

—o—

Harry I. Lutz has been elected secretary of the Edgcomb Steel Co., Philadelphia. He previously had been a member of the board of directors, and has been associated with the Edgcomb organization for the past 23 years.

—o—

Robert L. Reagan has been appointed factory general superintendent for Boeing Aircraft Co., subsidiary of Boeing Airplane Co., Seattle. He will direct operations in the Seattle Fabrication, Sub-assembly, Final Assembly and Tool Fabrication Divisions.

—o—

William W. Scull has been named general manager of manufacturing services of the B. F. Goodrich Co., Akron. The Engineering and Factory Service Divisions, machine and process development department, works technical laboratory, traffic and inter-plant operations departments are in the group. Mr. Scull has been production manager of plants of B. F. Goodrich Chemical Co., Cleveland, for the past two years.

—o—

William Boustead, formerly vice president and general manager, has been elected president of Pan American Alloys Inc., Scottdale, Pa. **Norman C. Hein** has been elected as an additional director. Other officers elected were: **C. C. Peters,** vice president; **Robert L. Crawley,** vice president in charge of sales; and **W. S. Peters Jr.,** secretary and treasurer.

PAUL C. POCOCK

Appointed executive vice president and general manager, Hydraulic Press Mfg. Co., Mt. Gilead, O. Noted in STEEL, Nov. 17, p. 84

WALTER G. TUCKER

Has been elected chairman of the board of Hydraulic Press Mfg. Co., Mt. Gilead, O. Noted in STEEL, Nov. 17 issue, p. 84

—o—

Calvert Carey has been elected president of Yale & Towne Mfg. Co., New York. Formerly a vice president, he succeeds the late **W. Gibson Carey Jr. Fred Dunning** has been elected executive vice president, and will also act as secretary and treasurer.

—o—

B. B. Kimball has been promoted to the post of advertising manager of Pontiac Motor Division, General Motors Corp., Detroit. He succeeds **P. R. Warmee,** who has resigned to become a Pontiac dealer in Van Nuys, Calif.

—o—

Francis J. Sehn has been appointed sales engineer for E. W. Bliss Co., Detroit. He will service stamping manufacturers in the Detroit area. Prior to this appointment, Mr. Sehn had been chief die engineer for Fisher Body Tank Division, and more recently was assistant master mechanic for the Bliss Co.

—o—

George H. Lynn has resigned as Washington lathe sales representative for the Axelson Mfg. Co., Los Angeles, machine tool manufacturer. He has accepted the position of Western Division sales manager with Niles Tool Works Co., Hamilton, O., and will have headquarters at Chicago.

—o—

Charles E. Weeks has been appointed assistant to the operating vice president, Southern Alkali Corp., subsidiary of Pittsburgh Plate Glass Co., Pittsburgh. He has served with the company since it was established in 1934 at Corpus Christi, Tex.

—o—

The Cincinnati Chapter of Institute of Scrap Iron & Steel Inc. has elected the following officers: President, **Ralph Kopelove,** Kopelove Iron & Metal Co., Dayton, O.; vice president, **Roy Adams,** Frank Adams & Co., Norwood, O.; secretary-treasurer, **Louis Goldberg,** M. D. Friedman Co., Portsmouth, O.

—o—

N. H. Collisson, former Navy captain, who served as coal mines administrator during the period of federal operation of the bituminous coal mines, has returned temporarily to the Department of the Interior as special assistant to the secretary, to coordinate and direct the various activities of departmental agencies engaged in work on the Marshall Plan for foreign relief.

—o—

Benjamin Schwartz, Benjamin Schwartz Co., New York, has been re-elected president of the New York Chapter, Institute of Scrap Iron & Steel Inc. **George Alper,** Queensboro Structural Steel Co., was elected first vice president, and **Milton Levenson,** Miles Metal Corp., second vice president. **Joseph A. Moskowitz,** Samuel Sons Iron & Steel Co. Inc., was re-elected chairman of the executive committee, **Albert Raphael,** Bronx Iron & Metals Corp., was elected secretary, and **Bertram J. Moskowitz,** Schiavone-Bonomo Corp., was elected treasurer.

—o—

Ab Martin, L. H. Means, E. S. McKay, and **D. J. Sullivan** have been appointed assistants to **W. V. Merrihue,** manager of employee and community relations in the apparatus department, General Electric Co., Schenectady, N. Y.

—o—

William E. Wrather, director,

ROBERT C. GRAVES

Appointed vice president in charge of sales, Federal Electric Products Co., at Newark, N. J. Noted in STEEL, Nov. 24 issue, p. 74

GEORGE W. FRICK

Named special representative in sales development, Latrobe Electric Steel Co., Latrobe, Pa. Noted in STEEL, Nov. 24 issue, p. 78

C. P. McCABE

Appointed works manager of the Bolt & Nut Division, Republic Steel Corp., Cleveland. Noted in STEEL, Nov. 24 issue, p. 78

United States Geological Survey, Washington, has been elected president, American Institute of Mining & Metallurgical Engineers. Two vice presidents elected are: **C. Harry Benedict,** Calumet & Hecla Consolidated Copper Co., Lake Linden, Mich., and **Donald H. McLaughlin,** president, Homestake Mining Co., San Francisco.

—o—

Joseph M. Brennan has been named general manager of the Drop Forge Division, Willys-Overland Motors Inc., Toledo, O. Before joining the company as director of works operations, he had been with General Motors Corp. for 20 years, during which time he traveled extensively for GM Overseas Division in South America, South Africa, the British Isles and in Europe. **George F. Bluth** has been appointed director of manufacturing facilities and methods for Willys-Overland. He has been assistant works manager.

—o—

The National Supply Co., Pittsburgh, announces the transfer of **Lloyd A. Harris,** diesel engine specialist, from the company's Superior Engine Division, Springfield, O., to the Plant Products Division. He will represent the company in sales and service of Superior engines in all branches of the oil industry, and assumes his new duties with headquarters in Houston, Tex.

—o—

United States Television Mfg. Corp., New York, has appointed as territorial service managers the following: **Theodore W. Buchter** will cover the New York area, Boston, Albany, Baltimore and Washington; and **L. Robert Fisher** will cover New Jersey, Philadelphia, Wilmington, and eastern Pennsylvania.

OBITUARIES . . .

Bradford Foote Sr., 75, founder and president-treasurer, Brad Foote Gear Works Inc., Chicago, died Nov. 19 in that city. He first entered the gear business with two brothers in establishing the company now known as Foote Bros. Gear & Machine Corp., Chicago. In 1924, however, he left to establish his own company.

—o—

George F. Nye, 83, president, Dobbie Foundry & Machine Co., Niagara Falls, N. Y., died recently at his home in that city.

—o—

Sidney N. Peters Jr., 39, vice president and director of the Lawrence Portland Cement Co., New York, died Nov. 23 in Summit, N. J., after an illness of several weeks.

—o—

Jean J. Stunzi, 66, consulting mechanical engineer, died at his home in Downington, Pa., Nov. 22. He had been retained by Sperry Gyroscope Co. Inc., Great Lake, L. I., N. Y., and was with E. I. du Pont de Nemours & Co., Wilmington, Del., in World War I, and subsequently with General Motors Corp. in Buenos Aires, Argentina, and São Paulo, Brazil.

—o—

Lawrence O. Kellogg, 48, president, Addressing Machine Supply Corp., Brooklyn, N. Y., died Nov. 23 at his home in Manhasset, L. I.

—o—

J. Frederick Burgess, 81, one time sales manager of Cleveland Automatic Machine Co., Cleveland, died Nov. 23.

—o—

Max A. Berns, publicity manager, Universal Atlas Cement Co., subsidiary of U. S. Steel Corp., New York, died suddenly of a heart attack on Nov. 19 at his home in New Rochelle, N. Y. He joined the Atlas Cement Co. at Chicago in 1913, and, following service in France during World War I, he returned to the company's Chicago office in 1919 and was made publicity manager. The publicity department was moved to New York in 1938.

—o—

J. H. Morrison, 68, vice president in charge of sales, Warren Foundry & Pipe Corp., New York, died at his home in Yonkers, Oct. 29. He had been associated with the corporation for the past 32 years, the last 17 years as vice president in charge of sales.

—o—

Robert Hartman, 61, retired founder and president of Multi-Products Tool Co., Newark, N. J., died in his home at Montclair, N. J., Nov. 21. He founded the Essex Tool & Die Co., Newark, in 1925, and 10 years later resigned to organize Multi-Products. He retired in April because of ill health.

—o—

August W. Willenbrock, 58, machine designer with Tobacco Machine Supply Co., Linden, N. J., died Nov. 21.

—o—

Richard Hirschler, 64, a mechanical engineer for 35 years with the Singer Mfg. Co., Elizabeth, N. J., died Nov. 20 at his home.

—o—

Harry Fagin, 59, vice president of Chapin & Fagin Inc., scrap brokers, Buffalo, died Nov. 17 in that city.

ANTIFRICTION BEARINGS

Speed of rotation, direction and magnitude of loads to be carried are determining factors in selecting proper bearings for super-precision machine tool spindles. This second article of the series describes some typical applications on milling, boring, turning and grinding equipment

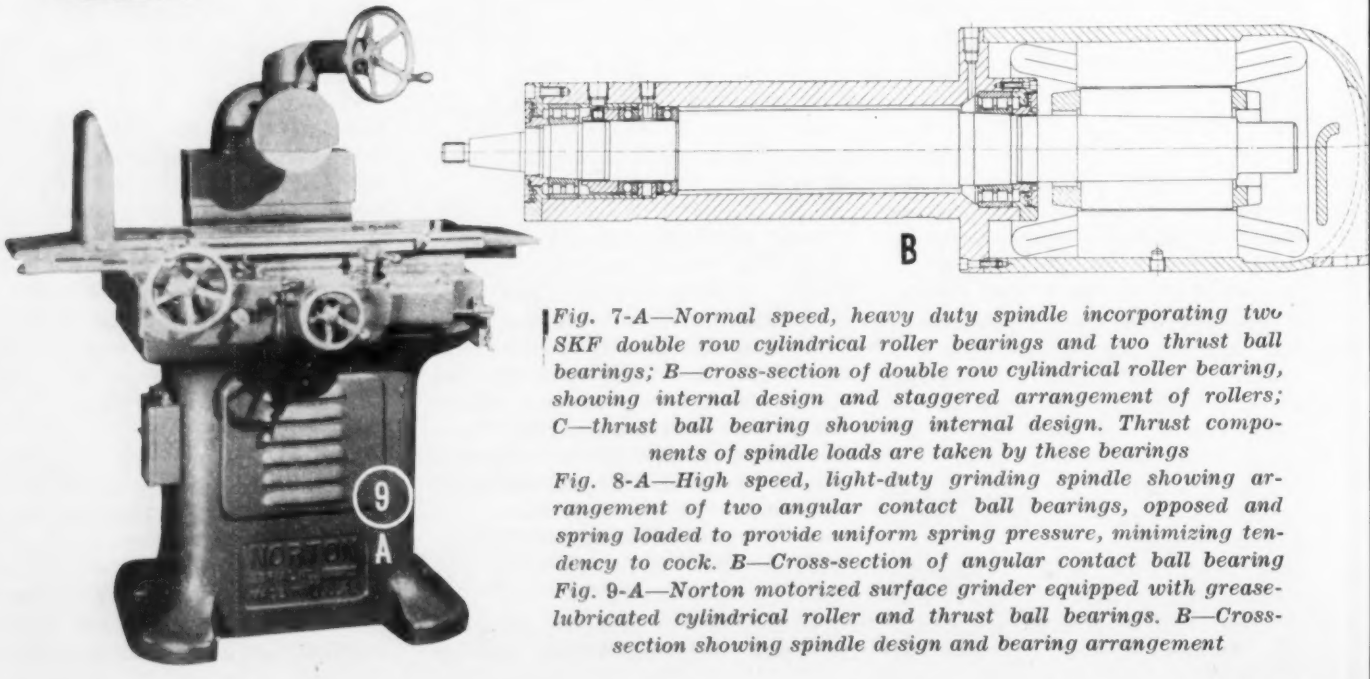


Fig. 7-A—Normal speed, heavy duty spindle incorporating two SKF double row cylindrical roller bearings and two thrust ball bearings; B—cross-section of double row cylindrical roller bearing, showing internal design and staggered arrangement of rollers; C—thrust ball bearing showing internal design. Thrust components of spindle loads are taken by these bearings

Fig. 8-A—High speed, light-duty grinding spindle showing arrangement of two angular contact ball bearings, opposed and spring loaded to provide uniform spring pressure, minimizing tendency to cock. B—Cross-section of angular contact ball bearing

Fig. 9-A—Norton motorized surface grinder equipped with grease-lubricated cylindrical roller and thrust ball bearings. B—Cross-section showing spindle design and bearing arrangement

By L. E. BROWNE

Associate Editor, STEEL

IN FEW applications of the antifriction bearing is design skill and selection of the proper bearing more important than for machine tools, notably super-precision spindles. Widely used in machine tools since first developed, bearings for gears and driving components generally conform to principles of general bearing engineering, but different and varying conditions are met in spindle design and application.

Speed of rotation, direction and magnitude of loads to be carried are determining factors in choice of the proper type of bearing. While there may be exceptions, ball bearing is usually best selected for small high speed applications and roller bearings for larger, heavier loads or where shock loading is encountered.

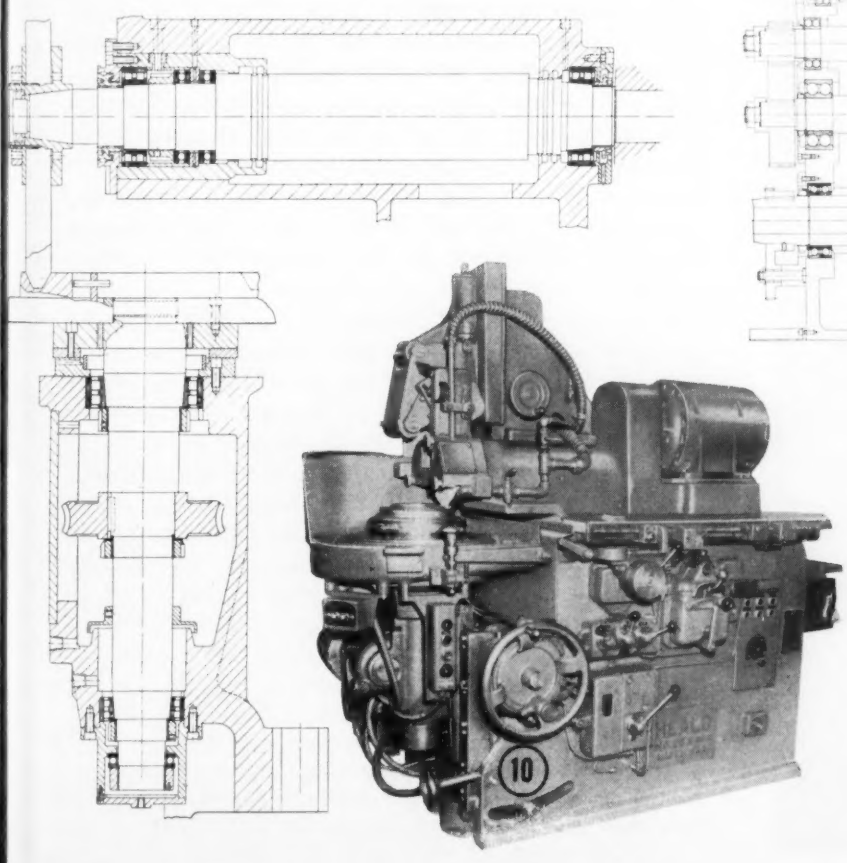
For some conditions, highest efficiency is reached by use of both ball and roller bearings in machine tool spindles; and where axial deflection under load must be limited, an opposed mounting is often employed with thrust bearings or duplex angular contact ball bearings. A heavy thrust load is frequently carried most satisfactorily by a separate thrust bearing, but if speeds are high, an angular contact ball bearing may be the best selection.

Greater use of carbide cutting tools, resulting in higher speeds, feeds and depth of cut, have a profound influence on selection of bearings for machine tools and spindles, increased rigidity being required to meet these conditions. Optimum efficiency is reached when spindle rigidity is combined with ability to operate through a wide range of speeds, with a minimum temperature rise, precison performance and without bearing adjustment.

In some spindle designs, among them SKF Industries Inc., bearing arrangement usually resolves the cutting tool pressure into radial and axial load components the radial being carried independently by radial bearings designed to carry radial loads only and the axial component by thrust bearings similarly designed. Amount of preload required for rigid spindle support is reduced by this bearing arrangement and a minimum of temperature rise is a result, Fig. 7.

In this ball and cylindrical roller bearing spindle design, the double row roller gives rigid support of the inner ring and eliminates creep under load. Because of press fit in the housing, firm support of the outer ring is assured, also spindle rigidity through positive control internal radial clearance; lapped rollers run on honed roller paths. Thrust ball bearings in this design contribute maximum axial rigidity, minimum camming action, low friction and temperatures under varying loads and speeds while no adjustment is necessary for changes in load and speed conditions. This is a normal speed, heavy duty spindle.

For high speed spindle applications, where ball bearings are the choice, radial and axial rigidity may be obtained by spring-loading a single angular contact ball bearing at each end of the spindle, Fig. 8. If duplex ball bearings are fixed at each end of the spindle, rigidity is secured (*Please turn to Page* 114)



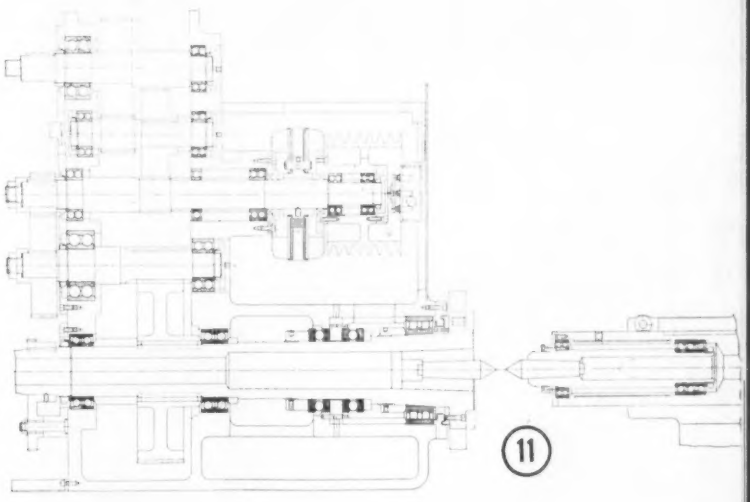


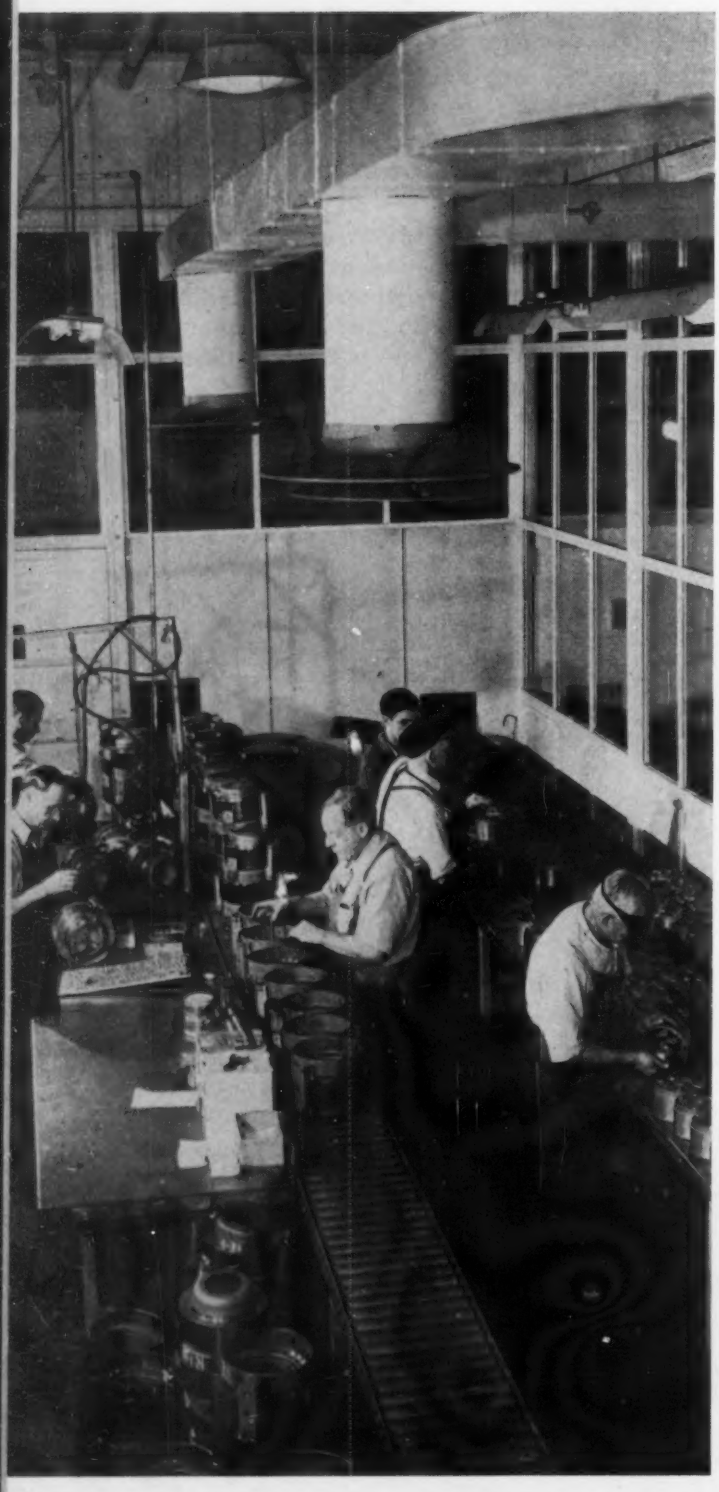
Fig. 10—Heald form grinder showing arrangement of precision double row cylindrical roller and thrust ball bearings on grinding and work spindles

Fig. 11—Thrust ball and double row cylindrical roller bearings are adjusted independently in this automatic lathe spindle design; thrust loads on tailstock are carried by angular contact bearings opposed by a spring loaded radial ball bearing. All illustrations courtesy SKF Industries Inc.

Air-Conditioned Production Area

. . . used to assemble precision parts for domestic refrigerator compressors

By R. J. ODABASHIAN
Works Mechanical Engineer
Westinghouse Electric Corp.
East Springfield, Mass.



IN EARLY stages of our experience in manufacturing domestic refrigerators, it was decided that it was both desirable and profitable to provide an area as free from dust as possible for the assembly of small precision parts used in the refrigerator compressor.

First attempt along the above lines at the East Springfield, Mass., plant was to build an enclosure of steel and transparent glass construction. Filtered air was provided through a duct distribution system. The air supply system was designed to provide sufficient make-up air to create a slight pressure inside the room. This pressure causes the air to leak outward from the enclosure, which prevents seepage of dust into the assembly area.

Heating facilities were incorporated in the system to assure constant temperature of the air in the enclosure during the heating season, but no cooling equipment was provided to take care of the summer conditions. This arrangement was not satisfactory from a personnel standpoint during the warm weather.

Psychological effect of working inside the enclosure was enough in itself to induce numerous complaints from employees that temperatures inside the room were too hot, even though the temperature was about the same as in the general factory area. We fully realized then that it was quite important to install comfort cooling for such applications.

When the assembly area was moved into another building about a year after the original installation, comfort cooling facilities were added to offset this adverse condition. The section was enclosed with the same type of steel and glass partition, and also was provided with the same built-up pressure arrangements.

Essential equipment in the new system includes: (1) Steam heating coils which temper the incoming outside make-up air in the winter; (2) thermostat to control the steam to these tempering heating coils, with the control bulb for the thermostat located outdoors. Thermostat is set to start opening the steam valve when the outside air drops to 50° F; the valve is fully opened when said temperature drops to 37° F.

(3) An air filtering system cleans the air of most of the troublesome dust. (4) Evaporators cool the air, and (5) two re- (*Please turn to Page* 109)

Precision parts for domestic refrigerator compressors are assembled in a glass-and-steel enclosed area, one corner of which is shown here. Overhead duct and diffusers provide 20,000 *cubic feet per minute of conditioned and filtered air*

AL BRYANT LOOKS AHEAD: When Alexander G. Bryant took over from Herbert H. Pease the presidency of the National Machine Tool Builders' Association at the close of the recent annual meeting at Hot Springs, Va., he coined a slogan which the capital goods industries in general might do well to adopt for 1948. Here is the Bryant slogan:

"For the year ahead, not undue optimism, not undue pessimism—but *realism!*"

Al Bryant has an unusually broad background against which to plan the program for NMTBA. Not only is he a machine tool builder (vice president, Cleereman Machine Tool Co., Green Bay, Wis.), but also he is a marketer of machine tools (president, Bryant Machinery & Engrg. Co., Chicago, and as such served two terms, 1937-1939, as president of the American Machine Tool Distributors' Association).

"Having had our big show in Chicago to demonstrate the genius of our engineers, let's boil the thing down to comparison with the past—by which I mean with machine tool designs of prewar vintage," said Mr. Bryant. "I have made a personal survey through which I am convinced that increase in efficiency of 'show-model' over 'pre-show model' machine tools ranges all the way from 10 to 500 per cent—the average increase in efficiency of the machine unveiled at the show being about 33 1/3 per cent.

"There probably now are in existence in the United States today about 1,750,000 power-driven metal-cutting tools. At least one-third of these are over 20 years old. All of the balance—including the machines installed during the war and until recent months—are either more than 10 years old in actual physical age or are of designs at least 10 years old.

"Bear in mind that machine tool designs were practically frozen throughout the war, so not until the present models were introduced at the show this Fall did most of the really modern machines become available. Bear in mind that even those wonderful machines which accomplished our great feats of war production are now outmoded.

"Concentrate on these facts in connection with your selling—and at the same time pound them home to the public. While it is true that the personal efficiency of the 60,000 people now employed in this country can and should be increased to some extent, the only way that we can hope to turn out the huge volume of goods now needed here and abroad is to implement American industry with the latest machine tools at the earliest possible time."

DR. LAIRD'S DIAGNOSIS: Out of the guest speakers at the annual meeting of the National Tool and Die Manufacturers Association at Philadelphia was Dr. Donald A. Laird, who is famous for his practical applications of psychology to industry and living.

Having heard Dr. Laird before, I expected that he would "come up with something good" and he did. This time it was his theory of "free-floating hate" to explain why too many people are not getting along too well with too many other people at this time.

During the war, explained Dr. Laird, tremendously powerful propaganda machines were set in motion to further the cause of every belligerent by pumping the populace full of hatred of the "opposition"—whatever and whoever that may have been.

With the relatively sudden ending of hostilities, the "normal outlets" for this high pressure hatred were to a considerable extent cut off, leaving everybody with an undue supply of "free-floating hate" which was and still is liable to break out at the slightest provocation. That is why salespersons have been too ready to "take it out" on customers—and vice versa for example, and it is one of the major reasons for industrial discontent.

According to Dr. Laird, this "free-floating hate" will work itself out in our systems in a reasonably short time, but in the meantime if employers and employes will use discretion in venting it upon each other, industrial tensions can be materially reduced.

The fact that Dr. Laird has the hand of a working man—even to the extent of one missing finger—lends a lot of weight when he talks shop to shopmen.

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

KEEP IT OFF THE FLOOR: The traditional practice of continually "picking them up and putting them down", as applied to the handling of parts in the process of machining, is becoming a thing of the past in modern production shops.

As a result, the term "floor-to-floor time per piece" no longer means much in reference to any one machine in a co-ordinated line which is laid out for the purpose of keeping work from getting on the floor.

Many years ago an old machinist, noted for his efficiency, told me that his constant effort was to plan things so that once his machine "got a grip on a part" it did not let go until every possible operation had been performed. "Every time you unchuck and rechuck it, and every secondary operation you perform on it—means just so much wasted time", was the way he sized up the situation.

That expresses exactly the production strategy underlying modern multiple spindle automatics and other station-type machines which do not cut the work from the bar—or release it from chuck or fixture—until every possible surface and hole which can be reached has been acted upon by tools on main or supplementary slides. That is the strategy underlying the "jigless" drilling units and machines which were so much in evidence at the Machine Tool Show in Chicago. That is the strategy underlying work-conveyor systems which link such machines "unit-to-unit" in modern production lines.

Importance of LUBRICATION in

In this comprehensive treatment, the authors present convincing evidence of the need for efficient lubrication in maintenance of forging equipment. Design of machinery components is analyzed in relation to heat, pressure, water and lubricant contamination

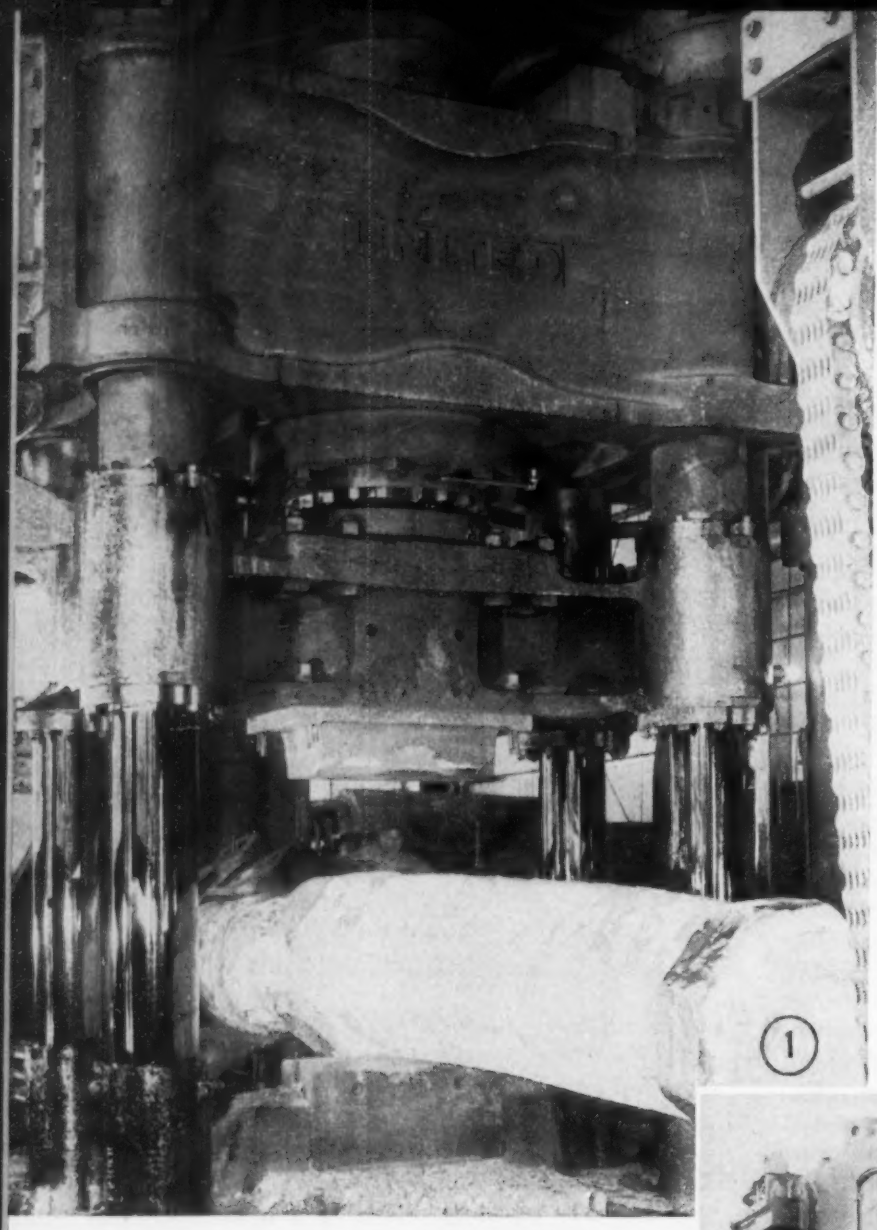


Fig. 1—United 1500-ton forging press showing location of guides with respect to piece being forged. Radiated heat must be considered in choosing lubricant for guides. Photo courtesy United Engineering & Foundry Co.

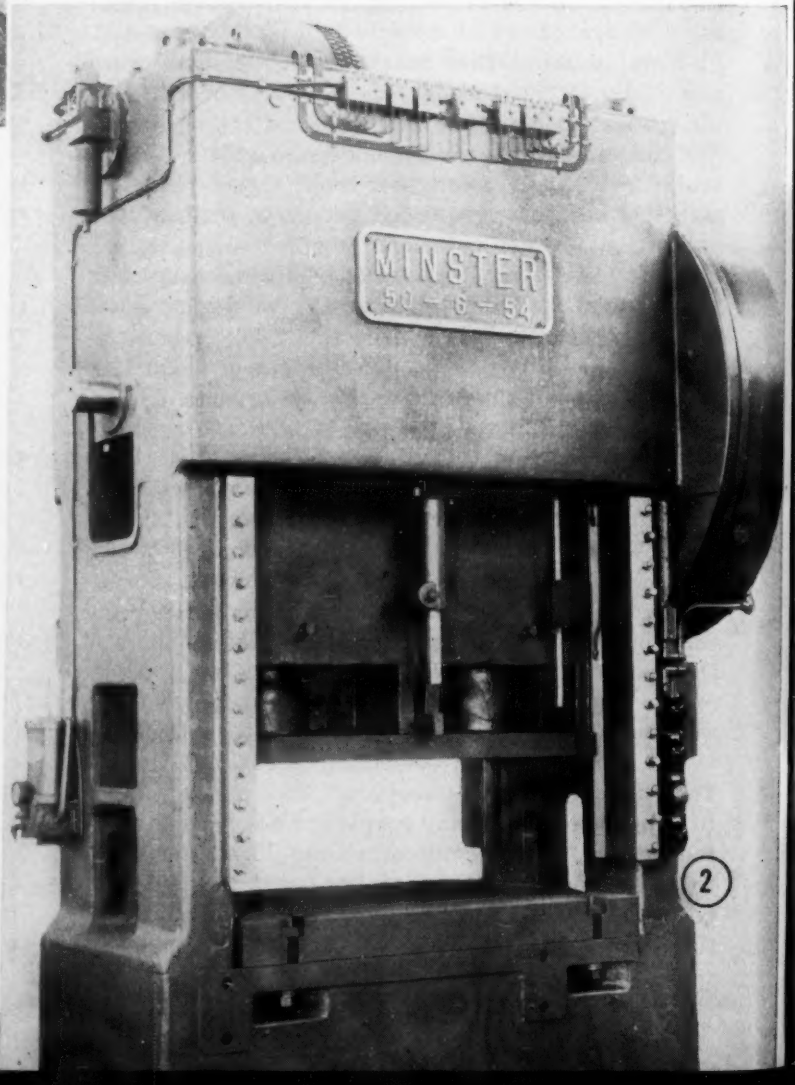


Fig. 2—Minster No. 50-6-54 press equipped with Farval Dualine, manually-operated grease system. Photo courtesy Minster Machine Co.

Fig. 3-A—Ajax air clutch forging machine showing locations of automatic oil pump, reservoir and oil distributors. B—Double plunger pump submerged in oil reservoir and driven off crankshaft by ratchet arm delivers oil to oil distributors or headers from which it is piped to oil pocket of each bearing. Lubricating system piping is under cover to protect it from damage. Courtesy Ajax Mfg. Co.

By A. F. BREWER and
J. C. VAN GUNDY
Technical and Research Division
The Texas Co.
New York

in FORGING OPERATIONS

FROM the very beginning of mechanized forging, the problem of lubrication has been serious enough to require considerable study. Heat, pressure, water and lubricant-contamination are the contributing factors. These conditions have had a lot to do with the development of the various lubricating systems in use today.

As mass production requirements increased and rapidity, as well as accuracy, of forging parts for automotive engines, for example, became primary objectives, lubrication of press and hammer mechanisms was given more attention. These machines were part of a production line, even though very often they might be located in another county or state. If they failed and required repair or replacement of scored bearings, flow of semifinished materials to the machine tool shop and finishing line could easily be disrupted.

This caused the lubricating engineer, designer and operator all to consider more dependable methods of lubrication. Then bearing design was reviewed in order to provide better protection against entry for nonlubricating matter.

Heat is present around a forging hammer or press, due to the temperature of the metal passing through it. Pieces ranging up to several tons in weight, preheated to a bright red (in the case of steel), carry a lot of heat through the machine. It is dissipated by radiation as the pieces are worked and cooled. A considerable amount of this heat is transmitted to the working parts, the control valve mechanisms, bearings, gears and guides.

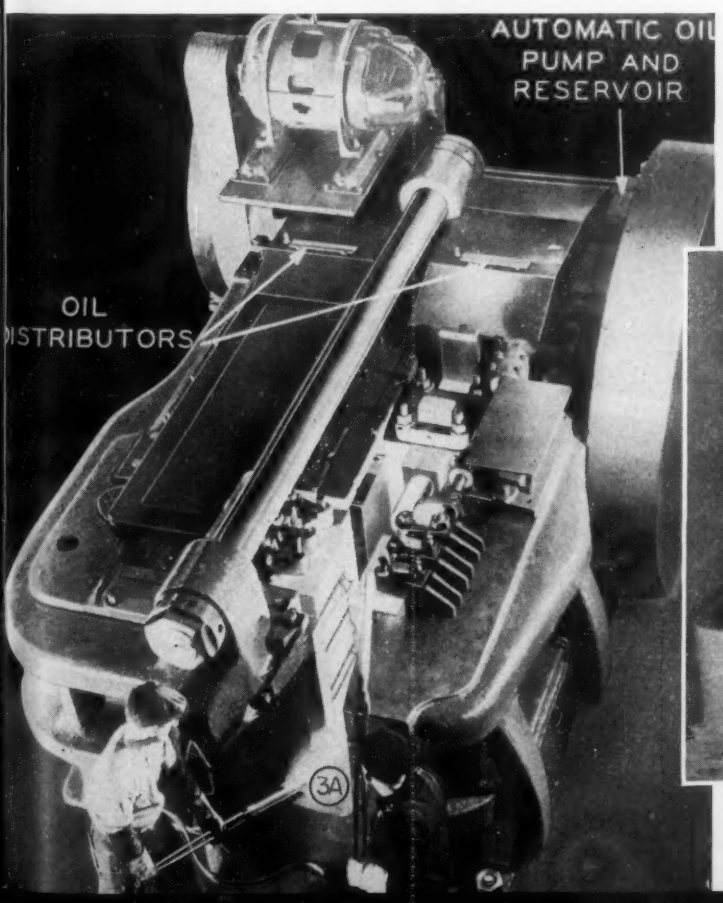
Heat tends to make any lubricant more fluid. This must be considered when selecting the products for any such mechanisms. It means that somewhat heavier or more viscous lubricants are required than for ordinary temperature service.

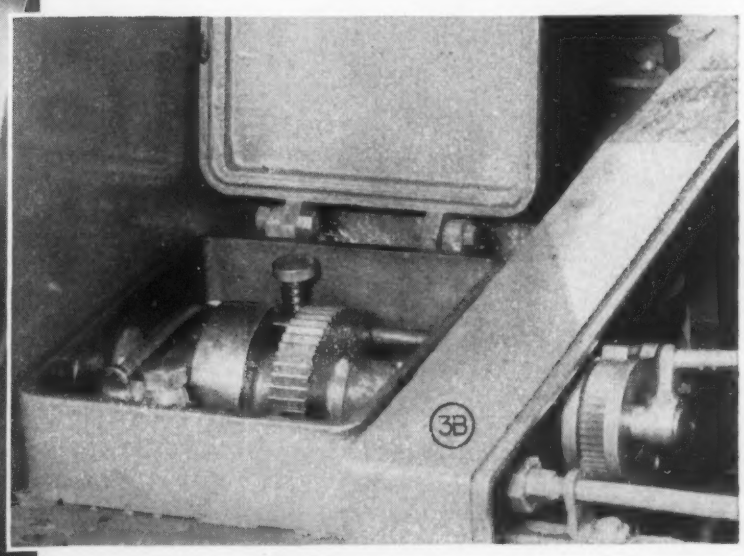
Controlled lubrication by measuring equipment will prevent this possibility to a large degree. Use of a centralized pressure lubricating system, on a press for example, will insure that just so much grease or oil is delivered to a bearing each time the lubricator functions.

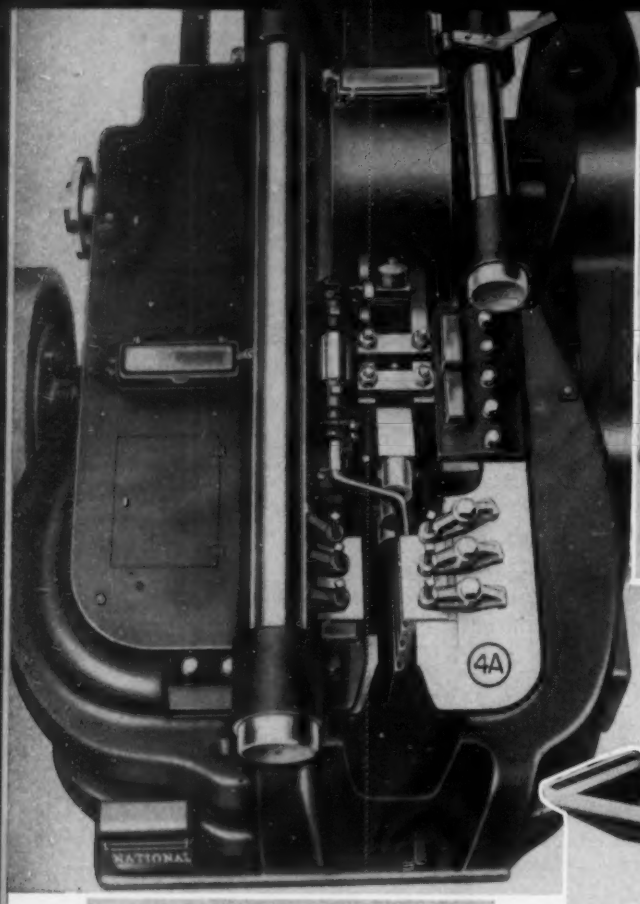
The same principle applies to the mechanical force feed oiler which is today so widely preferred for lubricating the steam cylinder and valve on a steam hammer, or the valve mechanism on an air pressure machine.

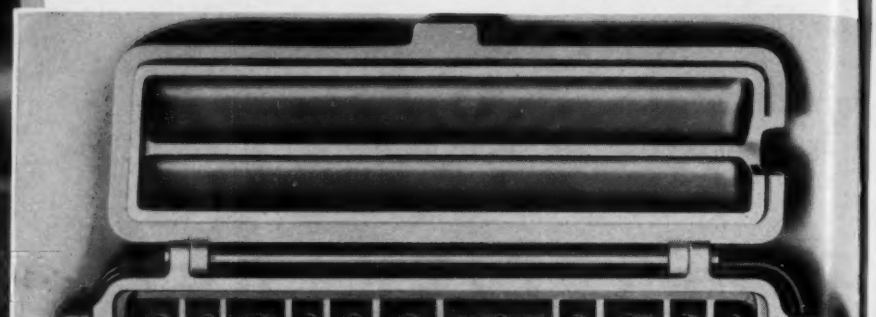
Pressure on the moving parts of an impact forging hammer is reactive. In other words, there are no abnormal pressures exerted while the piston rod or ram is being raised, but as it falls or is impelled downward to strike the piece on the anvil, the pressure exerted reacts upward and back upon the guides and upon the cylinder, stuffing box and valve mechanisms.

On a forging press, the pressure is also reactive,









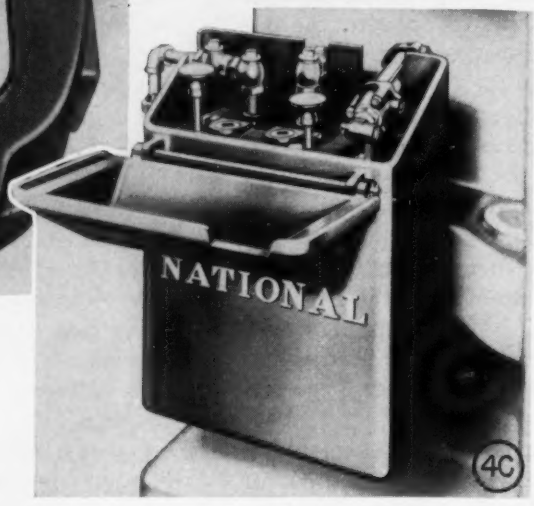
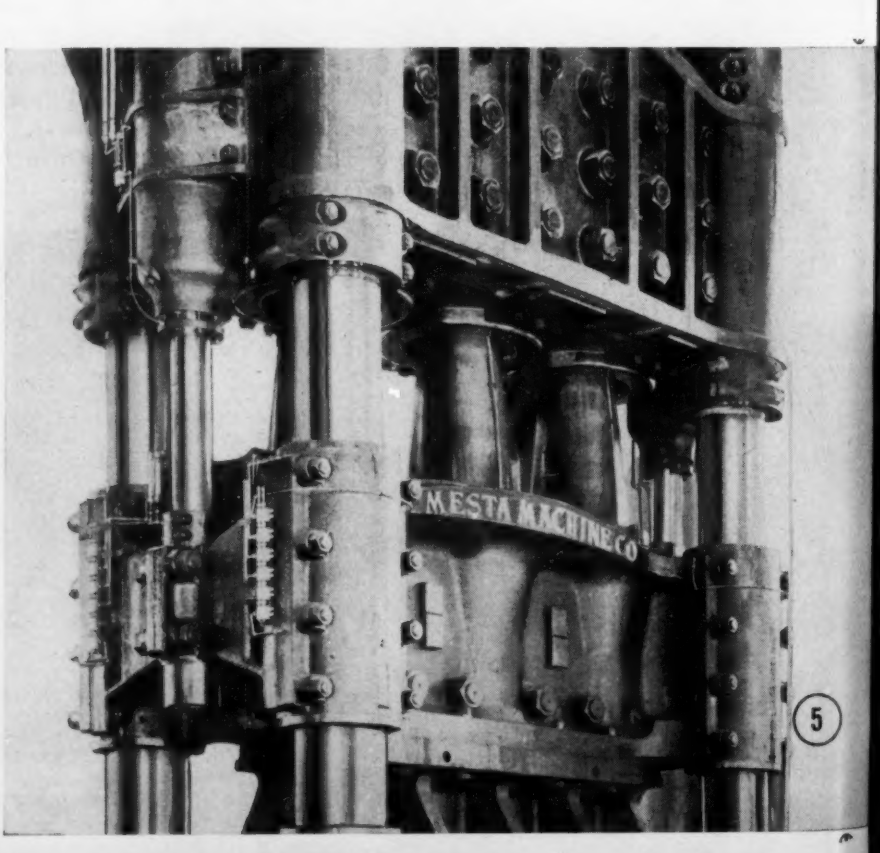


Fig. 4—The automatic oiling system as applied to National high duty forging machine. A—Top view of machine showing covers which keep dirt, moisture and scale from moving parts. B—Arrangement for oil rationing according to bearing requirements, oil emerging from two rows of holes to flow into pockets from which it runs to bearings. C—Reservoir in which two plunger type oil pumps are submerged and driven automatically by the machine. D – Piping layout of distributor system (under the cover) which can be removed as a unit. Courtesy National Machinery Co.

Fig. 5—Mesta 14,000-ton hydraulic forging and bending press showing some features of lubricating system. Courtesy Mesta Machine Co



but of a more continuous nature while the piece is being formed. In other words, there is less shock on the entire machine than in a hammer. This holds true whether the forging press is motor driven or controlled by hydraulic power.

Impact or reactive pressures exert a squeezing out action upon the lubricating film in a bearing clearance space or on gear teeth. It can be more serious on the latter, as the lubricating film is not confined and can spread out too thinly to give ample tooth protection on the next contact unless the film is renewed. This is approaching boundary lubrication and is one of the reasons for the perfection of extreme pressure lubricants which are now so widely preferred for heavy duty gear service.

Water can affect stuffing box and guide lubrication in a steam hammer. It results from leakage of condensed steam which drips or throws onto the guides. Leakage along the piston rod or ram obviously can affect the durability of the lubricant in the packing.

The detrimental effects of water are obviated by using lubricating oils of suitable emulsifying characteristics. These are obtained by compounding straight mineral oils with a small amount of fixed or fatty oil which will cause the lubricating film to develop an emulsion or lather when water comes in contact with it. Such emulsions are more cohesive and adhesive to metallic surfaces than straight mineral oils.

Parts to Be Lubricated: In addition to knowledge of the operating conditions, the type of motive power applied to forging machines must be studied. Basically it will involve steam, air, steam and water (hydraulic), oil (hydraulic), or electric motor driving through reduction gears or V-belts.

The drop hammer is driven by steam or air power; the board drop hammer by line shaft or motor drive. Drop hammers are used for drop forging heavy pieces at very high pressures where flat bed forming is very often employed, the faces of the ram and anvil serving as the dies.

Forging presses involve hydraulic operation or motor drive through reduction gear and cam arrangements, or a crankshaft and driving gear. Forging machines are more generally applicable to upsetting work in the production of smaller parts.

Steam—a source of energy used for centuries, and, at present, in almost every industry—is widely used as the motivating power in forging machinery. On forging equipment motion is obtained from steam pressure acting on a piston contained in a suitable cylinder. It is absolutely essential that the cylinder walls be lubricated, and the easiest way of getting the lubricating oil to all desired points is to make use of the steam itself. This is accomplished by injecting the oil into the steam line at a point prior to the steam's entry to valves and cylinders.

If oil is divided into minute globules as it enters the steam line and is then mixed intimately with the steam, all moving parts will be adequately lubricated. The more complete the atomization and the more thoroughly the oil is dispersed through the steam, the better will be the lubrication of valves and cylinders and the more economical the consumption of oil. The degree of atomization of the oil is influenced by the condition of the steam, the point of introduction of the oil, the velocity of the steam and the character of the oil.

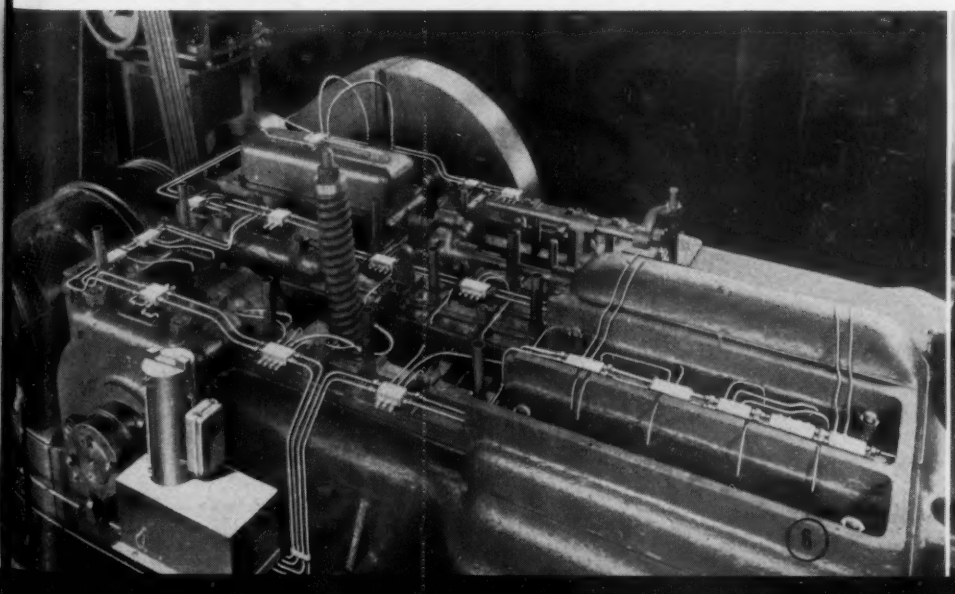
It is advisable in order to obtain good atomization that the point of entry of the oil into the steam line be located two to six feet before the valve or cylinder. If an oil is used which atomizes quickly, the point of entry can be close. On the other hand, more economical lubrication may be obtained, particularly with higher viscosity oils, if the point of entry is not too close.

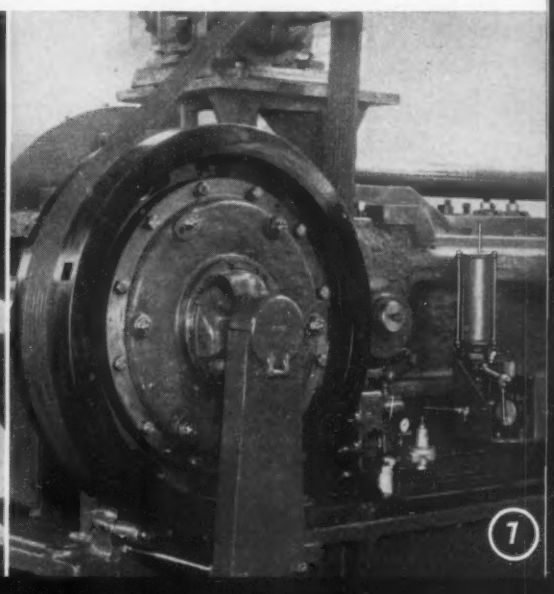
The choice of a suitable lubricating oil depends upon many factors, such as:

1. Are conditions such that the oil will atomize easily? (This often depends upon the type of atomizer used). (*Please turn to Page* 102)

Fig. 6—Farval full automatic system of centralized lubrication on an Acme forging machine. This system provides regular and frequent delivery of lubricant to all bearings, slides, toggle links and large diameter heavily loaded main eccentric bearings on such machines. Courtesy Farval Corp.

Fig. 7—Application of Trabon type M, positive force feed lubricating system to Ajax upset forging machine. High bearing pressures, heat and vibration make automatic lubrication desirable on such forgng equipment. Photo courtesy Trabon Engineering Corp.





Oxyacetylene POWDER C

By D. H. FLEMING Jr.
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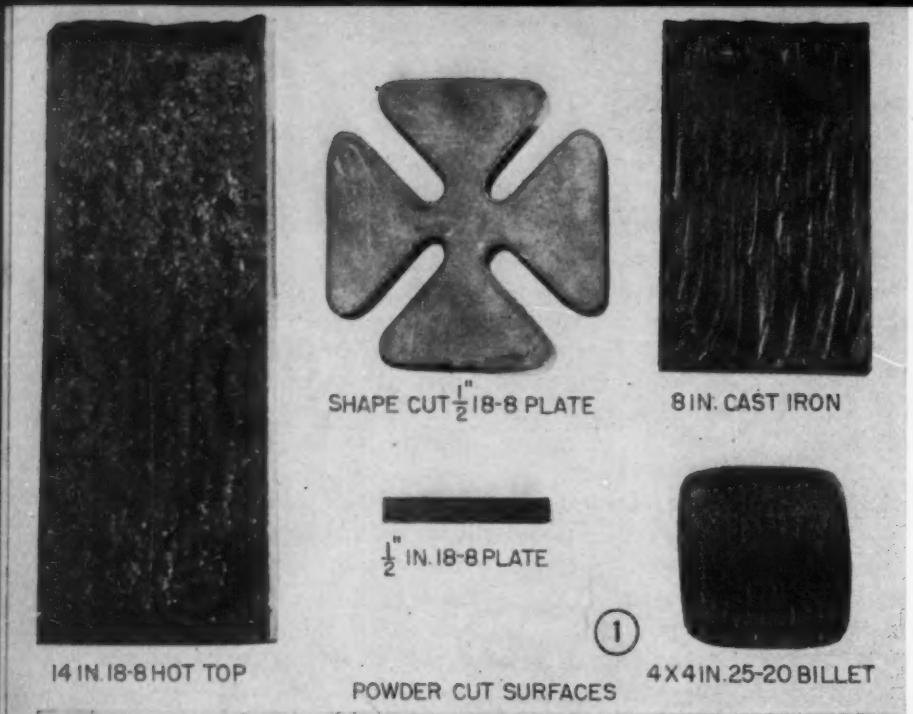

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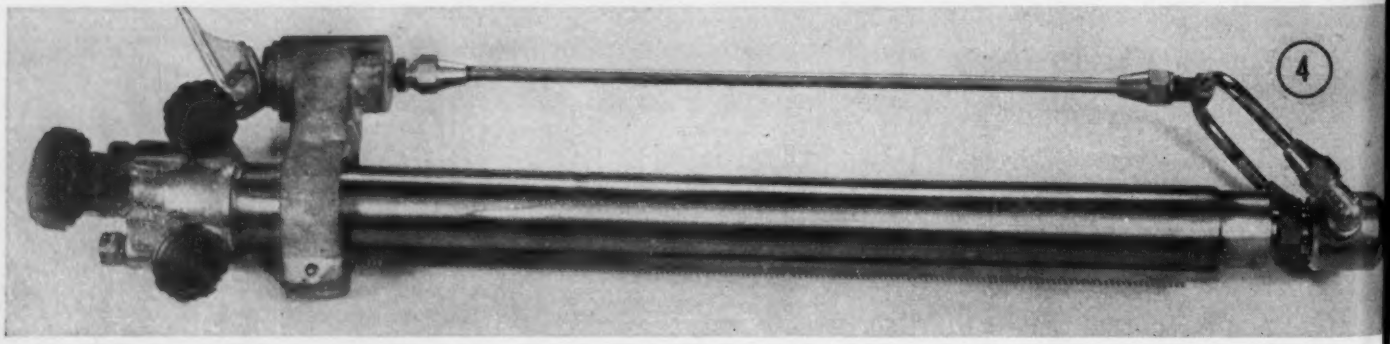


4

CUTTING and SCARFING

How the powder cutting reaction overcomes difficulties encountered in cutting oxidation-resistant metals is discussed in detail. Also described are a number of production applications on stainless steel, cast iron and nickel base alloys

POWDER cutting and scarfing has opened up a new field for the use of oxygen and acetylene in the metalworking industry. Originally developed as an aid in the production and fabrication of stainless steel, it has subsequently found considerable use in the cutting of cast iron, very high alloy ferrous metals, and certain nonferrous metals.

Process relies upon the introduction of finely divided iron-rich powder into the cutting oxygen stream. The powder is raised to its ignition temperature by the heating action of the preheat flames and then burns in the cutting oxygen stream to liberate large quantities of heat and create superheated particles of iron oxide. In cutting or scarfing stainless steels the alloying element, chromium, immediately forms chromium oxide, a highly refractory material with a melting point of approximately 3600° F.

If this chromium oxide is not continuously removed from the reaction zone, it forms a refractory coating on the kerf and prevents the oxygen stream from further attacking the base metal. The combustion of the iron powder, however, supplies the necessary heat and fluxing action to keep the chromium oxide in a fluid state and permits the cutting oxygen stream to oxidize the base metal continuously as is done in the cutting or scarfing of carbon steels.

Cast iron, with some exceptions, contains little or no chromium but is characterized by a high carbon content, the carbon generally being present in the form of graphite flakes. It is thought that these graphite flakes act as insulating or refractory areas interspersed in the iron matrix which hinder the conventional cutting oxygen stream from continuously reacting with the iron. Heat obtained from the burning powder aids in removing graphite flakes, however, and permits progressive cutting or scarfing as on carbon steel.

The cutting or scarfing (*Please turn to Page* 120)

Fig. 1—*Quality of cuts on stainless steels approaches that on carbon steel but cut surface has a rather pebbly appearance possibly due to selective oxidation of various alloys of the material*

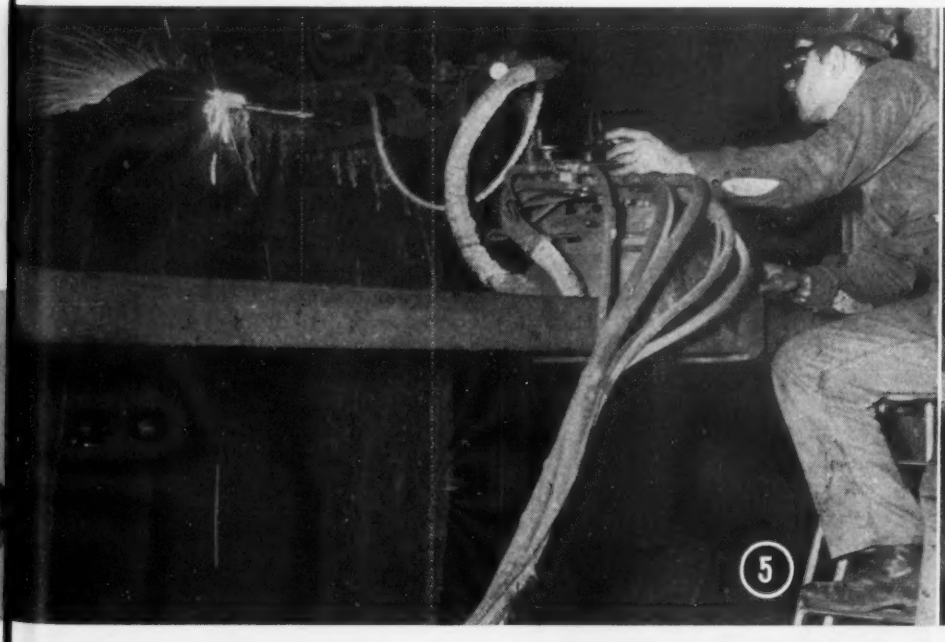
Fig. 2—*Powder dispenser, a common piece of apparatus required in both cutting and scarfing*

Fig. 3—*Scarfing an ingot*

Fig. 4—*For machine powder cutting, conventional blowpipes and nozzles are used by applying this powder cutting attachment*

Fig. 5—*Removing flash from bottom of mold*

Fig. 6—*Typical riser removal job on part for a centrifugal pump*



WELDING OF ORE BRIDGE

Effects Dead Weight Reduction

WELDING of all parts—except the main truss span and the cantilever spans—of a 15-ton capacity ore bridge built for a major steel company has made possible greater rigidity in the joints, use of somewhat lighter sections (dependent upon considerations of adequate structural rigidity) and a reduction of maintenance. Completed by Dravo Corp., Pittsburgh, the bridge features a low alloy, lighter weight trolley and several mechanical innovations in the trolley design.

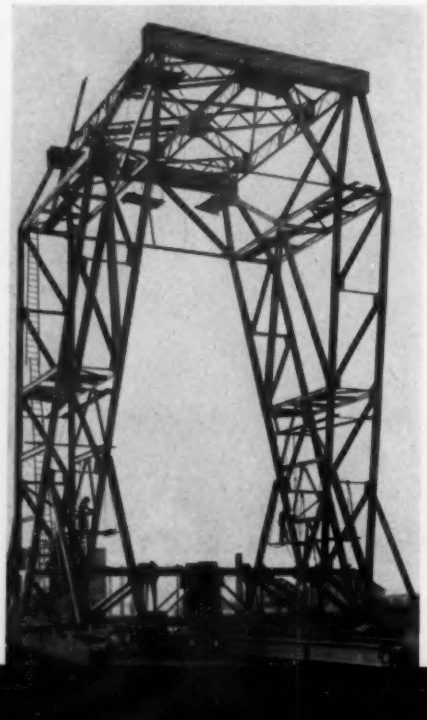
The bridge, shown in Fig. 1, is of the type which permits either leg of the bridge to advance beyond the other about 21½-feet while traveling, or until a 5 degree skew is reached. Superstructure cantilever spans are 158½ and 169½-feet long. Each of the two supporting legs has 32 rolled steel wheels 27 inches in diameter, fully equalized for carrying the 1250 ton bridge. Each set of 16 bridge travel wheels is worm gear driven by a single 65 horsepower motor. The bridge is said to be capable of a travel speed of 100 feet per minute.

To insure proper fit of the complex welded legs, these structures were shop assembled to avoid delays in final erection. Shipping units were made as large as possible to minimize field welding. Simplest of the two legs is the shear leg which forms an archway with a supporting bronze bushed ball and socket joint over the top center, from which the superstructure is hung. This type of assembly permits this leg to lean toward the center span as the bridge skews. During this period the bridge is stabilized by the pier leg, Fig. 2.

Pier leg consists of a double V-shaped structure supported by a trussed sill on the trucks and carrying two box girders at the top for the sliding superstructure support. It is made entirely of beams, channels and angles, except for the two box girders of plate construction. Four supporting skew plates in a true plane where the trusses of the superstructure rest on the pier leg provide for smooth skewing action. Use of welding on this leg is said by Dravo to have permitted great simplification of detail, especially at the points where legs meet girders.

Fig. 1 (above)—Welding was used for the first time in the fabrication of several of the components of this 15 ton capacity ore bridge

Fig. 2 (below)—All welded pier leg of the ore bridge. Leg was erected with a minimum of false work



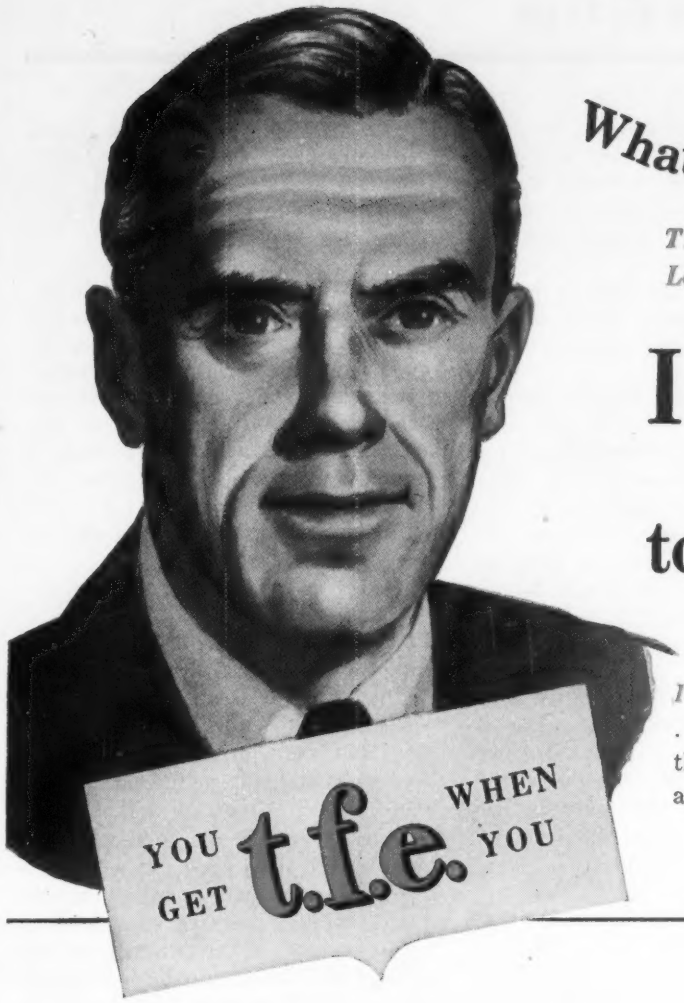
Erected first was the pier leg which required a minimum of falsework (see Fig. 1). All joints were brought into the same relative position that they had during shop assembly. It was reported that when the top girders were placed, no vertical adjustment was needed to put the four corners in a plane.

With main joints of the pier leg welded, erection of the superstructure began with the center span carried on two falsework bents which were moved progressively toward the shear leg. Cantilever spans were erected without falsework.

All welded in construction, the 120-ton trolley is supported on four 33 inch diameter spring mounted wheels and driven through herringbone gear reductions at speeds up to 900 feet per minute by two 75 horsepower motors. With a duty cycle of about 1 minute, it is reported that an experienced operator can handle 900 tons of ore per hour.

Trolley's main framework measures 10¾ x 33½-feet and is welded of Mayari-R low alloy steel. Its control house was shop welded into large assemblies and the operator's cab made as a complete unit with all control equipment. Floor plates and siding of the units of this type of steel also saved weight.

Dravo anticipates that the successful completion and resulting performance of the ore bridge having major welded components will point the way toward the further application of welding in this class of structure. Further advances in welding of material handling bridges, particularly the welding of joints that are subjected to fatigue stresses, will require more research on full size joints like those to be used in actual construction practices, it was said.



What do Fasteners Really Cost?

There's more to fastener cost than just price. Lots more. Personally . . .

I look for all 8 to get t.f.e.

True Fastener Economy

It is the many costs of using a fastener that count . . . not just the initial price. *True Fastener Economy* is the lowest *total* cost for fastener selection, purchase, assembly and performance.

1. Reduce assembly time to a minimum by savings through use of accurate and uniform fasteners

2. Make your men happier by giving them fasteners that make their work easier

3. Reduce need for thorough plant inspection, due to confidence in supplier's quality control

4. Reduce the number and size of fasteners by proper design

5. Purchase maximum holding power per dollar of initial cost, by specifying correct type and size of fasteners

6. Simplify inventories by standardizing on fewer types and sizes of fasteners

7. Save purchasing time by buying larger quantities from one supplier's complete line

8. Contribute to sales value of final product by using fasteners with a reputation for dependability and finish

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

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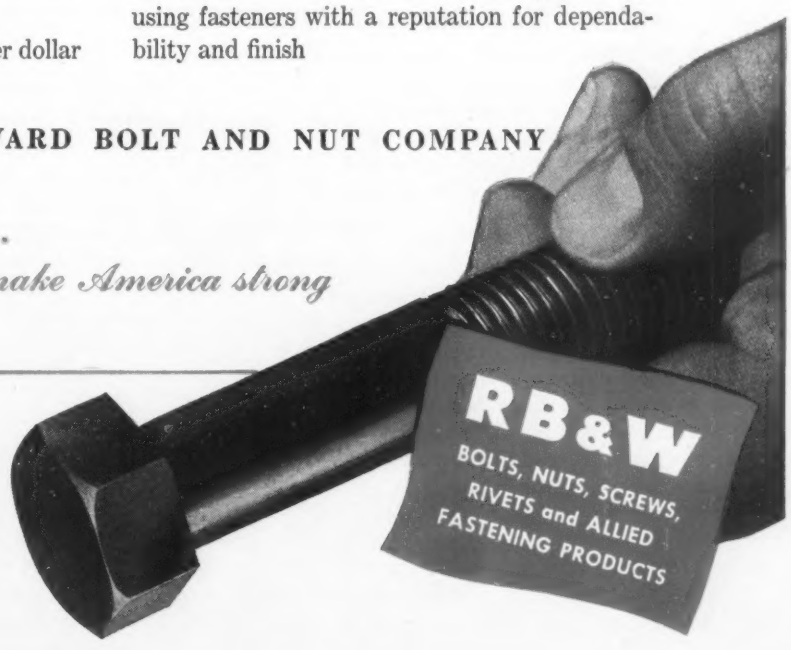

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Engineering News *at a Glance*

TUBED "ON THE FLY": Tube forming Yoder machine in the plant of Monroe Auto Equipment Co., Monroe, Mich., plays a leading role in the processing of some 14 miles of shock absorber cylinders each day. Steel strip is sent through a number of sets of grooved rolls which progressively bend and form the strip into tubing with butted edges. Partly formed tubing continues a few feet into an electric welding section of the machine, and as it continues to travel, a single point tool in the same machine removes the flash before the tubing reaches a drawing machine where it is formed to the desired diameter.

SULPHUR IN OIL: Low sulphur content in cutting oil may show the same or even better performance than an oil containing much sulphur when cutting a relatively hard steel, it was learned from Standard Oil of New Jersey, New York. Its lubricating engineers point out that poor finish resulting from too high sulphur is characterized by bright flecks or burnished spots on the machined surface. Bright flecks or burnished spots also occur when cutting with a new sharp tool and should not be confused with a similar appearance resulting from a worn tool.

THE POWDER WAY: Manufacture of steel back copper-lead lined bearings in the plant of Federal-Mogul Corp., Detroit, involving the use of metal powder, represents an easy way to do a hard job. Metal powder is spread upon a continuously moving steel strip, sintered, rolled, again sintered and the lined strip stamped into bearing blanks. Compacting as usually done in powder metallurgy is not essential in the process; in fact not desirable. Dies and die wear not a problem.

UNIFORM CURRENT CONTROL: Even though the latest rheostat made by Ohmite Mfg. Co., Chicago, is smaller, more uniform current control is provided by a method of taper winding—winding the unit in three sections of diminishing wire sizes—adopted by the company. In a uniformly wound rheostat, the company states, each degree of rotation adds a constant number of ohms to a constantly increasing number of ohms. Therefore, as the rheostat shaft is rotated, resistance increases more slowly and current decreases more slowly than before. Taper wound unit, on the other hand, increases the number of ohms per degree of rotation as total ohms in the circuit increases. This makes rotation versus current curve more nearly linear, thus providing more uniform current control.

WELDING CUTS OVERHEAD: By designing a 5-horsepower, 20-cubic-foot-per-minute air compressor cylinder and crankcase assembly for welded construction, Globe Mfg. & Compressor Co., Battle Creek, Mich., is now saving some $13.76 in materials and $7.14 in direct labor costs. To further reduce production costs, the company recently adopted stud welding to circumvent necessity of drilling and tapping some 30 holes for cap screws. Globe reports the crankcase is the only welded type in the compressor industry.

WASTE FOR FUEL: Furnaces that burn low-cost substitute fuels—by-product fuels from steel and oil refinery operations—are being developed by combustion engineers to save industrial "fuel dollars" it was revealed recently before the Atlantic City annual meetting of American Society of Mechanical Engineers. Otto de Lorenzi, director of education, Combustion Engineering Co., New York, pointed out that as a result industrial by-products, formerly regarded as necessary waste, may be used to supplement and even substitute completely for fuels presently used.

RESISTS BLOWOUTS: "Steel tire" displayed by United States Rubber Co. recently, before the American Trucking Association, Los Angeles, was reported more resistant to blowouts, following a year's tests on truck fleets. Use of fewer plies, coupled with the resistance offered by the steel cords to heat, result in a cooler running carcass, it was explained.

MACHETES EN MASSE: Charles D. Briddell Co., Chrisfield, Md., recently developed a new technique for high speed production of machetes, exported to Latin America by the thousands. Various designs required for this market are blanked out from flat-rolled stock—usually 0.90 carbon—and precision ground on high-speed grinders. Previously machetes were made from forged blanks.

"SOUND" BUSINESS: Industrial application of sound waves received new stimulus with the erection recently, by Ultrasonic Corp. of Cambridge, Mass., of a unit to precipitate carbon black for Godfrey L. Cabot Inc., according to the *Industrial Bulletin* issued by Arthur D. Little Inc. The pilot unit is so successful that other industrial applications are being investigated.

LICKS CONTRACTION: Thermal expansion or contraction in tools and in parts occur in the same ratio since adoption by Glenn L. Martin Co., Baltimore, of a new method of tooling that involves the use of aluminum alloy in tools as well as parts. Formerly, when tools of a dissimilar metal were used on parts of aluminum, temperature changes in the plant caused thermal expansion at different rates in the two metals. Two 25-foot aluminum parts, for example, when drilled in steel jigs would be mismatched at one end by 0.075-inch if that end was drilled at room temperature of 55° F and the mating part drilled at 95° F. Mismatching was eliminated by employing similar metals in both the tools and parts.

CLADS TO ORDER: Kinney process developed by American Cladmetals Co., Pittsburgh, does not create an alloy, but bonds two distinct and dissimilar metals together in a union that is complete, inseparable and permanent. Many different metals can be combined according to industrial demands for efficiency, durability, safety or appearance with the process, it is reported.

NO REPLACEMENT PROBLEM: Because its silicone rubber gaskets do not adhere to metal and withstand temperatures as high as 400° F without losing their original characteristics, General Electric Co. is incorporating them in chemical reactors used in manufacture of resins, it was learned in Pittsfield, Mass. Absence of a plasticizer in the silicone rubber stock is said to be instrumental in the excellent resistance the material provides to solvents.

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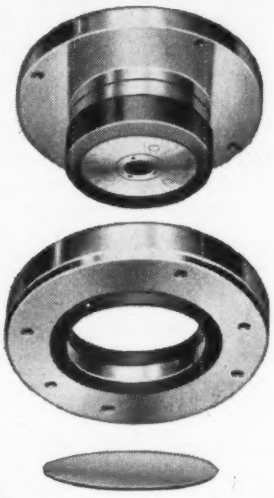
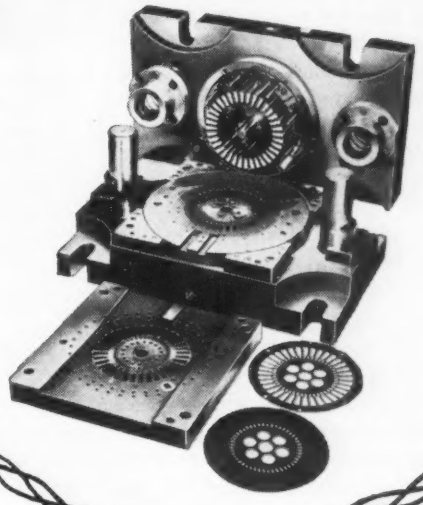


to the COMPLICATED OPERATION



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Importance of Lubrication

(*Continued from Page 95*)

2. The steam pressure, and whether the steam is superheated, or contains some condensate.

3. Subsequent use of the steam. If it is to be used for heating or condensed and used for boiler feed, it is necessary that the oil be removed.

Generally, steam used in forging plants ranges in pressures from 80 to 150 pounds per square inch. Since the boilers are usually some distance from the forging machinery, normally some of the steam condenses in transit to form what is known as "wet steam", that is, it contains some condensate.

Presence of some moisture in the steam will usually result in a film of straight mineral lubricating oil being readily washed off from the cylinder walls and other surfaces with which the steam comes in contact. Therefore, to secure the proper lubrication under wet steam conditions, it is necessary to either increase the rate of flow of straight mineral oil (which may not be economical) or use an oil containing a certain percentage of fatty compound such as lard oil, degras, or tallow.

Compounding develops an emulsion through mixing of the compounded oil with moisture in the steam. The lubricating film of emulsion thus formed has a great affinity for the wearing surfaces and is resistant to the washing action of the water. The greater the percentage of moisture in the steam, the higher should be the fatty compound content of the lubricant, though ten to twelve per cent is about the usual maximum.

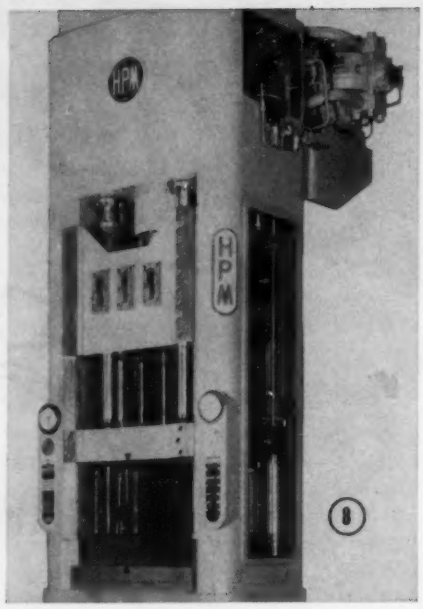

Fig. 8—HPM 200-ton CU-3 Fastraverse hydraulic press requires no lubrication except ways on uprights which are contacted by gibs fastened on the slide. Lubrication is furnished by a Bijur system, using oil from surge or supply tank. Courtesy Hydraulic Press Mfg. Co.

In many plants the steam after use in forging equipment is condensed and used as boiler feed, or used at low pressures for heating purposes. In either case, it is advisable first to separate the oil from the steam or condensate. Unfortunately, the property which causes compounded oils to unite with water to form emulsions in the cylinders also prevents ready separation from steam or condensate. Likewise, the more completely the oil is atomized the more difficult it is to separate.

To attain effective lubrication of steam cylinders, one must have a thorough understanding of the operating conditions. Too often the value of effective lubrication is lost sight of because of other pressing maintenance problems. If in doubt concerning the choice of a suitable-steam cylinder oil, the services of a competent lubrication engineer should be enlisted. He has behind him years of research by petroleum chemists plus a wealth of application experience.

Hammers Use Air or Steam

Steam forging hammers are normally used for preliminary forging operations and for small quantity production on pieces of considerable size. Although these hammers are normally called steam hammers, they can be operated on either steam or compressed air. The choice depends on the availability of steam or air at the location of the machine.

There are also pneumatic hammers operating on air which are distinctive from the forging hammer. In these, power is supplied by an electric motor which drives a double-acting compressor cylinder interconnected with a double-acting power cylinder, air being used as the medium for moving the power cylinder.

Air cylinder lubrication is important in that the oil must be resistant to formation of objectionable carbon deposits and gummy residual matter.

When air is compressed, heat is developed. As a result, the oil film on the discharge valves can be exposed to a sufficient amount of heat (according to the pressure) to cause partial distillation. As this continues, the lighter hydrocarbon portions which evaporate from some oils are carried off with the discharged air, leaving the heavier (and perhaps gummy) fractions in the cylinder where they tend to build up sticky, oily deposits. A well refined compressor oil resists decomposition tendency so that a cleaner compressor system will result.

Dust and dirt from the surround-

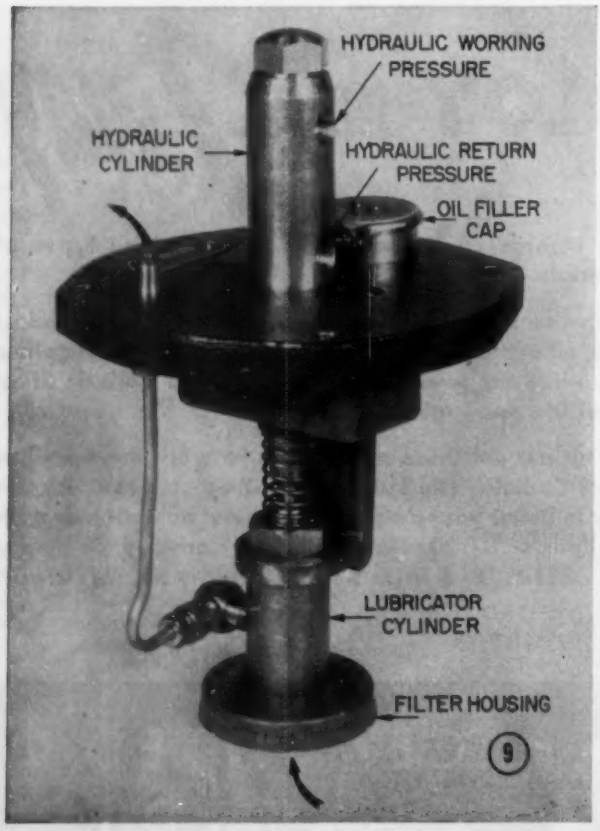

Fig. 9—Pump unit details of Bijur type Y lubricator. Hydraulically operated, this device force-feeds a measured quantity of hydraulic oil to a 5-way junction on press shown in Fig. 8, from which four feed lines run, one to each press guide. Courtesy Bijur Lubricating Corp.

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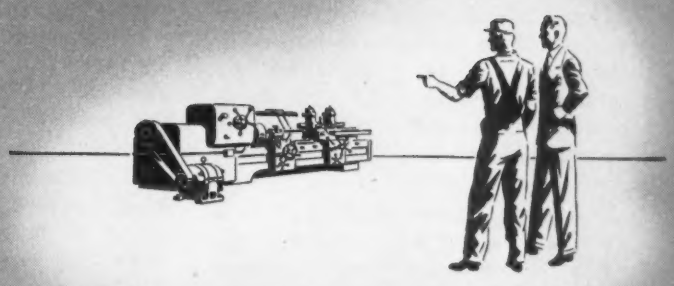

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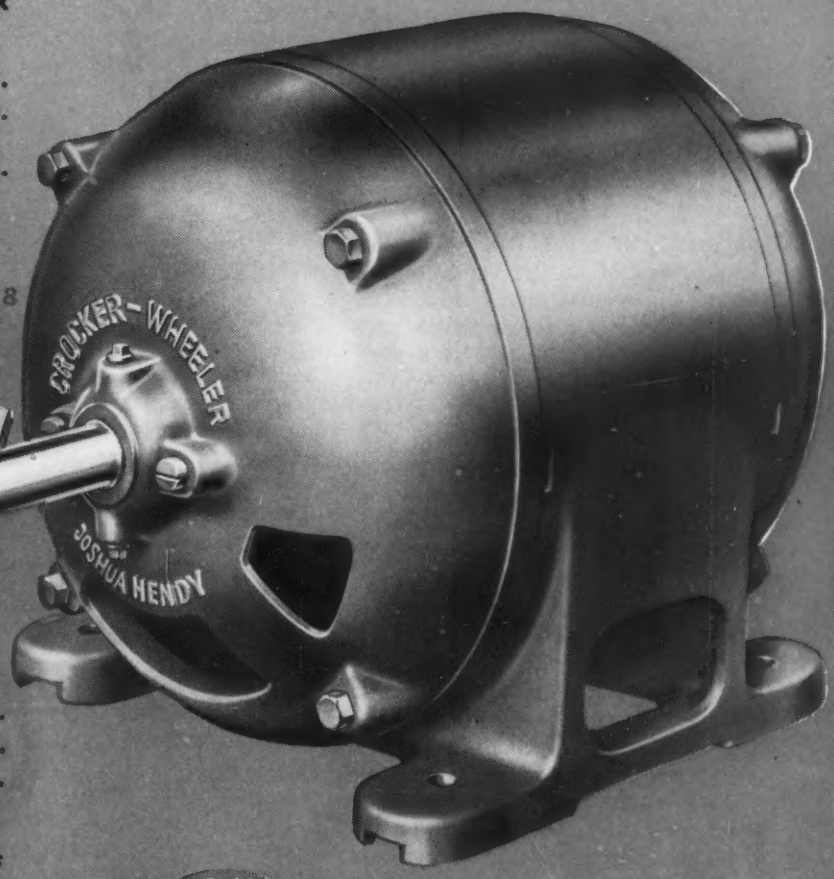

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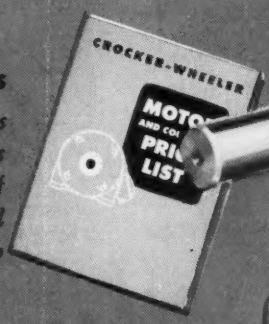

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ing atmosphere will be carried into the forge compressor unless the air inlet is equipped with a filter. As forge shop air is naturally dusty, a filter is decidedly beneficial as it insures against abrasive dust getting into the compressor cylinder to mix with oily residues and cause stuck piston rings and cylinder wear in the machinery.

For air cylinder lubrication a straight mineral oil, specially refined for compressor service of around 300 seconds Saybolt Universal Viscosity at 100° F is usually recommended. Not much oil is required for air cylinder lubrication—only a few drops a minute—the rate of delivery being accurately controlled by a mechanical force feed oiler.

Hydraulic Power: Most parts on a hydraulic forging press are lubricated by the hydraulic oil which is used to operate the machine. It is an automatic procedure in which the oil lubricates as it is circulated. Normally the only external lubrication required is on the surfaces of the press slides or uprights. This is done by means of an external oil circulating system which delivers a measured quantity of oil at each stroke of the press.

Only the highest quality oil should be used for hydraulic forging press operation. It must be resistant to oxidation and capable of protecting the surfaces of the hydraulic pumping system against rust. Oxidation of hydraulic oils is a factor which may cause considerable trouble if a suitable oil is not used to prevent this condition.

There would appear to be but remote possibility of rusting as such systems generally are water-free at the start and the moisture content of petroleum oils is negligible. There is, however, possibility of condensation of moisture from air, as the system is not absolutely air-tight. In damp, humid localities, when temperatures may vary widely, condensation must be reckoned with. An antirust additive combined with oxidation inhibitors in the hydraulic oils is the answer. In addition some hydraulic oils are so processed that they are highly resistant to foaming—a very desirable property when incorporated in such lubricants.

Viscosity range of forging press hydraulic oils varies according to the size, speed and temperature conditions. Hydraulic oils of 300 to 500 seconds Saybolt Universal at 100° F are generally used, although products of the same quality are available from 100 to very nearly 1000 seconds viscosity to meet the requirements of specific builders of hydraulic systems.

The lubricating ability of these oils is equally as dependable. By their resistance to oxidation and their high degree of lubricating value, they insure that lubrication of the working mechanisms of the system will be maintained free from gum-forming deposits and capable of immediate reaction to the control system of the mechanism.

Motor bearings on forging machinery or forging presses are lubricated according to the design of the bearings, i.e. sleeve type bearings which are ring-oiled, or antifriction bearings which are pressure grease lubricated.

In planning for lubrication of ring-oiled sleeve bearings a limited quantity of oil is involved which is subjected to very rapid circulation by the turning of the ring which is suspended from the rotor shaft. When this ring turns, it dips in the oil in the bearing reservoir, and a certain amount of oil is continually carried up to the surface of the shaft and into the bearing clearance. This is oil circulation in its simplest practical form.

Ring oiled motor bearings often run comparatively warm due to limited provision for cooling. This is very apt to happen if the oil level is carried too high. If the level is right, so that the ring just dips, the oil reservoir in the average ring-oiled bearing will contain sufficient oil so that time will be permitted for a certain amount of rest, and settling out of contaminating foreign matter which might have been picked up through windage. Well refined, light bodied oils (from 200 to 300 seconds Saybolt Universal Viscosity at 100° F) such as are used in average forge shop motors, settle out contaminants very readily.

The duty of the lubricant in a ball or roller bearing motor is interesting. It extends beyond lubrication. The ability to prevent actual metallic friction must be augmented by the protective ability, whereby the lubricating film is such that corrosion is prevented regardless of the atmospheric conditions. It was this requirement which prompted so much active research on the part of the petroleum industry.

As a result of this extensive research program there has been remarkable progress in the development of materials to retard oxidation and corrosion, and in the formulation of refinery procedures which render ball and roller bearing lubricants usable over a wider range of temperatures than ever before. These products retain their intended physical and chemical state and withstand the gum-forming effects of oxidation, to a remarkable degree.

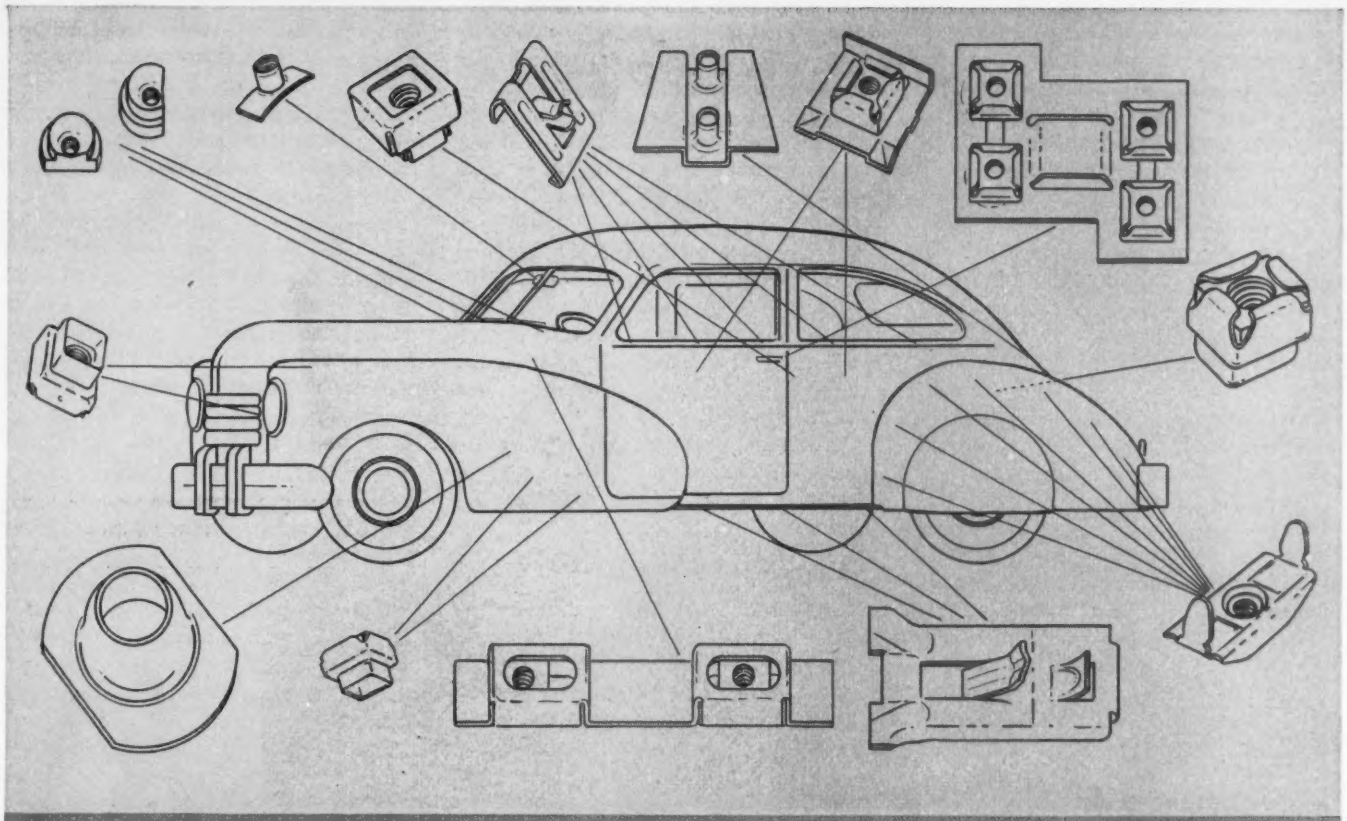
Reduction gears are used in pneumatic motor-driven hammers, and mechanical forging presses. In the former, the gearing transmits motor power at reduced speed to the piston in the air compressor cylinder; from here, air power actuates the ram in the power cylinder. In the forging press, gearing transmits motor power to a back shaft, flywheel and clutch to the main crankshaft.

Lubrication of gears in this service depends upon how they are installed. If an oil-tight housing is provided, bath lubrication with a comparatively fluid oil is practicable. Another advantage of a tight housing is that the gear teeth and lubricant are protected against dust, dirt, scale and moisture. This permits the usage of a higher quality gear lubricant in the machine.

Viscosity or body of the lubricant will depend upon the loads which must be carried by the gears. A comparatively thick lubricating film is often conducive to best protection of exposed gears though it should not be so adhesive as to develop abnormal drag; this would increase the power consumption, especially on starting or when functioning under comparatively low temperature operating conditions.

Excessive noise can usually be taken as indicating that gears are not lubricated as they should be. Temperature is also a factor though it is almost impossible to use the temperature of the gear case as a criterion, as is practicable where bearings are involved. With bearings, abnormal metal-to-metal friction will frequently be indicated by an increase in temperature which can oftentimes be felt by hand. In a gear case, however, there is so much more space available that any heat which might be developed through actual metallic contact between gear teeth would probably be dissipated before it has a chance to raise the temperature of the case.

Whenever wear may be suspected, or noise may indicate faulty lubrication, it is well to clean the gears with a comparatively light machine oil or flushing oil. Then the extent to which wear has been occurring can be observed. If this has not gone too far, it is necessary only to relubricate and proceed with the operation. Generally speaking, however, even though there is no indication of excessive noise, cleaning out gear



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cases about twice a year will be advisable where a machine has been in operation comparatively steadily. This holds true especially if metallic contaminants have had a chance to work in and reduce the lubricating ability of the gear lubricant.

Where gears are exposed, or not fully enclosed the problem of protecting wearing surfaces of the teeth is more difficult than with fully enclosed gears. The essential factor is to select a lubricant which will adhere tenaciously to the teeth and resist the throwing-off effects of centrifugal force.

Where the extent of contamination may be high, cleaning and relubrication should be done more frequently as heavier gear lubricants which retain contaminants can develop into abrasive grinding compounds. It is for this reason that the more adhesive types of strictly gear lubricants are not always as satisfactory for such gears, as are those more fluid products which will keep the gear teeth free from accumulation of abrasives by virtue of their washing action.

This latter action, however, will involve the necessity of suitable drip pans in order to prevent a sloppy and hazardous condition around the machine. It is difficult to practice oil economy where lubricant is used in this manner. On the other hand, oil economy, in forging, while important, must frequently give way to machine protection and the more outstanding essential of continuous production.

Trend Toward Noncorrosive

Lately, there has been a decided trend towards the mild, noncorrosive type of extreme pressure oil for such service. Load and operating conditions favor this trend, and furthermore, lubricants of somewhat lower viscosity can be used. This load carrying capacity is obtained by blending high quality mineral oils with carefully selected lead soaps, in such a way as to produce compounds of marked stability and adhesiveness.

Other outstanding characteristics of this type of lubricant are: (1) Noncorrosive to steel used for gears or to copper, bronze, or cadmium-nickel bearing metals; (2) exceptionally good adhesive qualities even when gears are deluged with water; (3) does not separate in storage or service; (4) retains its extreme pressure characteristics during lengthy service; (5) can be mixed or thinned down with a lighter grade of the same type of oil if cold weather service or more easy application requires a product of lower viscosity.

Handling of fluid oils under uniform pressure conditions is helpful in reducing operating temperatures through the cooling effect of the fresh oil. A variety of systems have been worked out ranging in simplicity from the unit type of force feed oiler to the multiple feed devices whereby an entire series of bearings can be served by measured quantities of oil under the same constant pressure. The principles as involved in the mechanical force feed oiler are applicable to delivery of: (a) Steam cylinder oil to the cylinders of the steam hammer; (b) air compressor cylinder oil to the air cylinder of the pneumatic hammer; (c) bearing lubrication of air clutch forging machines.

Lubricator Connected to Machine

In a device of this type the lubricator is connected directly to some reciprocating part of the machine. As a result oil is fed to the various cylinder outlets or to the bearings at a rate which varies directly with the speed of operation. This type of lubrication functions only when the machine is running, hence there is little chance of wasting oil or flooding the parts to be lubricated.

Mechanical force feed lubrication has other advantages in that it normally will feed the same amount of oil regardless of the temperature, the viscosity of the oil or the amount of oil in the reservoir. The quantity of oil delivered is regulated by adjusting the length of the plunger stroke or the time required to complete a stroke.

The nature of the oil is important. In addition to being a well refined product with good chemical stability, it must have good relative fluidity at low temperatures. As measured by the viscosity and pour test, the fluidity, especially at low temperatures, becomes highly important in conjunction with the pressure available. The pour test requires consideration, especially when the machines are subject to low temperature starting conditions because the rate at which the oil will flow may be affected in a system where the oil is recirculated. Should it become too sluggish at any time, flow off from a bearing might be impaired to cause backing up of the oil in the system. Furthermore, if any bearings are improperly sealed, oil might leak from the case. This would result in waste as well as a sloppy condition on the operating floor.

Where the viscosity or pour test are too high the decreased fluidity may also develop marked increase in power consumption. This would prevail throughout the system, for not only would the circulating or oil delivery pumps have to do extra work, but also the main drives might feel the extra duty demanded due to the increase in internal friction within the lubricant itself. As the automatic nature of any such system is increased, more careful consideration of these factors of pour test and relative fluidity is required. The oil system piping must always be of ample size to prevent abnormal friction losses occurring within the system, or reduction in oil flow.

Water has already been mentioned. It becomes a factor with respect to lubrication whenever it may come in contact with the lubricating film. This must be considered in the steam hammer, both with regard to cylinder lubrication, as well as leakage of condensate from the piston rod stuffing box. Water leakage can throw onto the guides which keep the ram in position, and cause wear if the lubricating film is not resistant to water. For this reason highly adhesive products generally are used for guide lubrication, and compounded oils for the cylinder.

In a pressure oiling system water is objectionable, for it may seriously impair the lubricating ability and cause sludge to form which may prevent free flow of the oil. For this reason, the oil must be comparatively water-free at the beginning, and able to separate readily from water. In such systems straight mineral oils are used.

Engineer Plans System

Responsibility devolves upon the designing engineer to plan for a water-tight system and the operator to keep it so. Prevention of entry of water into a pressure oiling system adapted to an existing machine, however, may require some study as minor changes in construction may be necessary.

The application of centralized pressure lubrication systems capable of handling grease or heavy oil is another very prominent advancement in the lubrication of drop hammers and other types of forging machinery. The basic features are of interest, viz: (1) Possitive delivery of measured quantities of lubricant at periodic intervals; (2) non-lubricating foreign matter is excluded; (3) economy of lubricants; (4) minimum hazard in handling or filling; (5) remote control. These principles relate particularly to heavy duty machinery bearings. The advantages of pressure lubrication are obvious. Study of means for centralized lubrication of such

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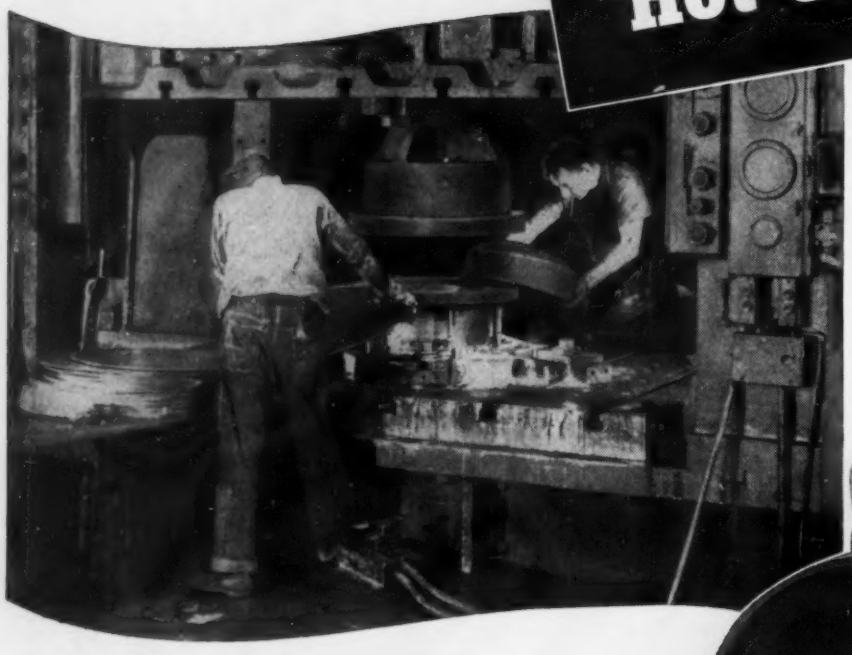

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bearings, therefore, was a logical consequence.

The lubricant can be controlled and impelled to the various points of delivery in several ways. In all, power in some form or other must be used. Where positive piston displacement types of metering valves are employed at each point to be lubricated, hydraulic power has been found to be especially adaptable as a means of valve control. On such a system either one or two lubricant supply lines can be connected to each valve according to the nature of the service. Here one line serves to load the respective valves periodically with the right amount of grease, the other serving as the medium of discharge.

There are other types of centralized pressure systems which require electric power or compressed air for their operation. Some of them are designed to eliminate the necessity for springs, check valves, or restricted port openings. The constant pressure which is exerted upon the lubricant assures of positive flow and the elimination of air pockets. The latter are always objectionable, and their development will depend to some extent upon the body of the lubricant, for the heavier the lubricant the greater the chance that air pockets will develop.

Heavy bodied oils are very often preferred in such systems for the lubrication of hammers and other forging machinery because the oil provides a flushing action on the large slides that are exposed with each stroke of the ram. Some greases, on the other hand, would tend to pick up scale, dirt, and other foreign matter to form an abrasive compound.

Oil washes this foreign material away before it can do any harm.

Accessory Bearings: Pressure gun grease lubrication prevails on most of the other important bearings on the drop hammer; and on the forging press unless a centralized pressure lubricating system is installed. On the drop hammer of the steam, air or pneumatic type, the parts which are usually unit-lubricated include the frame bearings, on the anvil, and the roll shaft eccentric and floating head bearings; the joints of the valve gear and in some cases the guides or slides.

On the forging press, such parts as the bearings of the clutch and pinion shaft can be lubricated satisfactorily by pressure grease gun.

Air Conditioned Area

(*Concluded from Page* 90)

frigeration compressors provide the cooling medium to the evaporators. (6) Two thermostats in the return air duct control the operation of two compressors. Thermostats are so set to provide sequential starting and stopping of the compressors as the cooling demand changes.

(7) Main steam heating coils heat the mixture of make-up and recirculater air. (8) Thermostat, located in the return air duct, controls the steam to these main heating coils. (9) Balance of the system contains the circulating fan, distribution ductwork, and diffusers.

All of the equipment is located in a so-called apparatus room, with the exception of the distribution and return ductwork, and the diffusers. The return duct is 48 x 48-inches and is located outside the building proper. This duct is insulated and weatherproofed.

The present dust-free room or glass house contains approximately 7100 square feet of floor area. Outside building wall provides one side of the enclosure and the other three sides are glass and steel partitions. The air-conditioning system injects 20,000 cubic feet per minute of filtered and conditioned air into the room. Outside make-up air is 7000 cubic feet per minute and the recirculated air is 13,000 cubic feet per minute.

In a production area of this type, it is very important that any tool or equipment generating dust inside the enclosure be eliminated or controlled by means of an exhaust system; otherwise the clean air provided is fouled or nullified by the interior generated dust. Air conditioning of an assembly area, as explained, serves a two-fold purpose: It minimizes the troublesome dust that gets on the assembled parts; and secondly, it controls the temperature in the enclosure, which is conducive towards improved personal comfort and efficiency.

Welded Fabrication on Ground Speeds Building

Development of a method of prefabricating of light weight, lattice web studding in 10 foot panels is reducing erection time of a three story office building for WKM Valve Co., Houston, Tex. Panels, fabricated by welding on the ground at the building site, consist of the studs, which are made by Bethlehem from special rolled sections by a hot slitting, rolling and expanding process, leaving them with a 1½-inch flange and a minimum steel thickness of ⅛-inch. Made in 3, 4 and 6-inch widths, the studs reportedly will support a safe load of 6000 pounds when braced laterally.

When a panel is finished it is lifted manually by four men, placed in position and welded to the building framework. Use of Fleetweld No. 5 and 7 electrodes and machines manufactured by Lincoln Electric Co., Cleveland, was made by the contractors, Brown Construction Co. and Matthews Construction Co.

Total erection time for the steel framework was approximately 21 days, including set-up preparation. The completed building, finished with a stucco exterior and a plastered and veneered interior, reportedly will be fireproof, shrinkproof, free from warpage and virtually soundproof.

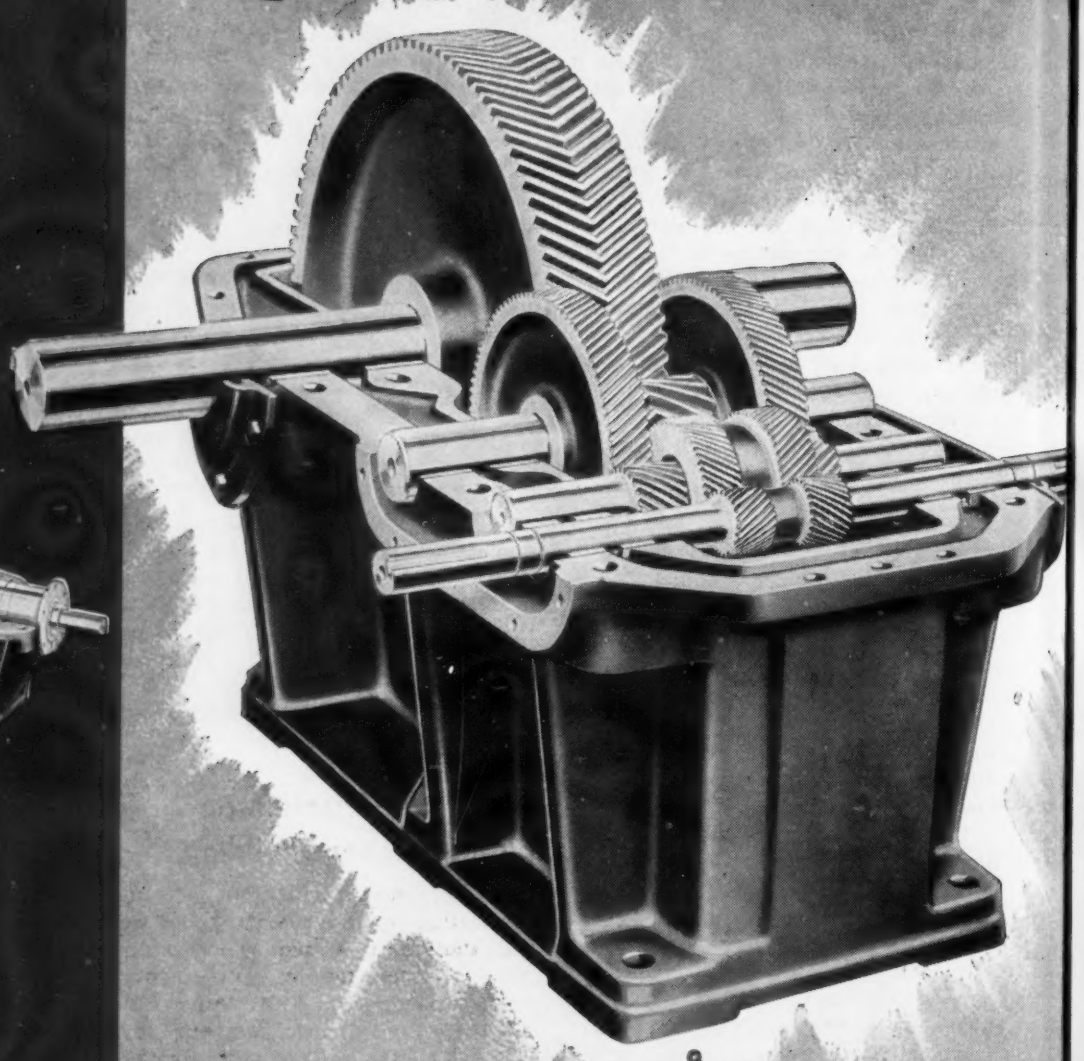
Bronze Die Set Bushings Increase Accuracy Life

Providing the advantages of a basic hard steel body and a bearing bronze liner electrolytically alloyed with indium, new low friction bushings which are reported to increase the accurate life of die sets are now being manufactured. Indium is said to be of great value in special bearing applications involving pressures up to 10,000 pounds per square inch —pressures at which scuffing and scoring frequently occur—according to Standard Machinery Co., Providence, R. I., maker of the bushings.

Extreme care is exercised in the preparation of the basic steel bushing, the company states, it being hardened and ground inside and out so that it may be installed and removed from the die set without scuffing. Keyed in position by an internal groove is the liner, formed from bearing bronze rolled to a precise gage and provided with coined, spherical impressions which serve as oil pockets or reservoirs. This liner is installed in the bushing under pressure by a burnishing operation.

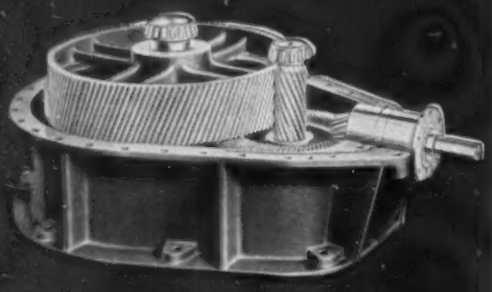
Succeeding operation is an electrolytic plating and heat treating process which sets a layer of indium over the entire liner bearing area. It is said to be a noncorroding metallic element with inherent lubricating qualities which reduce the coefficient of friction and eliminates galling or seizure even when normal lubrication is temporarily suspended. Indium can be alloyed by diffusion into the surface of nonferrous metals by heat treatment, the company says, making the alloy so formed harder than the indium itself or the base metal of the bushings.

FALK Speed Reducers



RIGHT (main illustration)

Parallel shaft, herringbone Falk Speed Reducer. Ratios: single reduction, 2.2:1 to 10:1; double reduction, 11.5:1 to 70.2:1; triple reduction, 80:1 to 300:1.



ABOVE

Right angle Falk Speed Reducer with vertical low speed shaft. Available in single reduction units, 1.5:1 to 5.28:1; double reduction, 5.7:1 to 43.5:1; triple reduction, 52.1:1 to 430:1.

ABOVE

Right angle Falk Speed Reducer. Available in single reduction units, 1.50:1 to 5.28:1; double reduction, 5.7:1 to 52.1:1; triple reduction, 56:1 to 515:1.

You Are Entitled to All These Qualities

strength . . . in Falk Speed Reducers is assured by the Falk "know-how" in determining materials, and by special production techniques developed by Falk alone.

rigidity . . . is built into every Falk Speed Reducer. Extra rigidity gives better performance and longer life.

compactness . . . of Falk Speed Reducers is the result of long experience in designing units that provide high efficiency, yet occupy a minimum of space.

simplicity . . . of design, has been achieved by Falk engineers in the development of the complete line of Falk Speed Reducers.

You get them all in every Falk Speed Reducer

THE FALK CORPORATION, Milwaukee 8 Wisconsin

Precision manufacturers of Speed Reducers . . . Flexible Couplings . . . Motoreducers . . . Herringbone and Single Helical Gears . . . Heavy Gear Drives . . . Marine Turbine and Diesel Gear Drives and Clutches . . . Steel Castings . . . Contract Welding and Machine Work. District Offices, Representatives, or Distributors in principal cities.

Designed to Fit the Job!

WHATEVER your speed reducer problems or requirements, it is good business judgment to consult Falk first.

Today's line of Falk Speed Reducers is the culmination of more than a half-century of experience in metallurgy, gear design and the production of the highest quality power transmission equipment.

Falk Speed Reducers are available in many styles, types, ratios and capacities . . . they are the choice throughout industry because of their suitability to a wide range of requirements. There are many models . . . built in parallel, vertical and horizontal right angle types, with single, double and triple reduction ratios. Efficiencies of 96% to 98½% at full load are attained through special Falk techniques of design and construction. Balanced performance is assured . . . longer gear life . . . smooth-running operation. Every Falk gear, herringbone or single helical type, is precision made . . . the patented lubrication system provides increased efficiency. Parts are interchangeable.

Each Falk Speed Reducer is built to give long and trouble-free service . . . to be dependable and efficient under all working conditions in all types of service . . . and to represent the long-range economy sought by the careful buyer.

Throughout industry . . . from power to production, it's . . .

FALK a good name in industry!

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MORE STRIP CAPACITY

Celebration of Detroit Steel Corp.'s silver anniversary in 1948 to mark initial operation of its new cold-rolled strip mill at New Haven, Conn. Additional capacity to amount to 60,000 tons per year

NEXT year will be a banner one in the history of Detroit Steel Corp., Detroit. Not only will it be the silver anniversary of the company's organization, but it will also mark initial operation (in October) of the company's new cold-rolled strip mill at New Haven, Conn. Foundations for the latter are now being poured and erection of steelwork will begin in January.

Detroit Steel was organized in 1923 by C. P. Craine, W. C. Schrage, A. A. Schrage and associates to produce cold-rolled strip to be distributed by the Craine-Schrage Steel Co., started the year previous. Craine-Schrage developed a substantial business, centered around Detroit, and grew steadily over the years, selling the output of Detroit Steel, as well as an appreciable tonnage of carbon and alloy bars, tool steels, drill rod, wire rope and other commodities purchased from outside mills. When it first began operations, Detroit Steel had capacity of around 1000 tons of cold-rolled strip per month. Its original capital investment was about $500,000.

Logical Tie-In—In July, 1944, Reliance Steel Corp. entered the picture, with its five plants in Detroit, Cleveland, Chicago, Worcester, Mass., and Lyndhurst, N. J. Processors and distributors of sheet and strip steel in both mill and warehouse categories, this company made a logical tie-in with Detroit Steel and Craine-Schrage. Thus a merger was negotiated successfully.

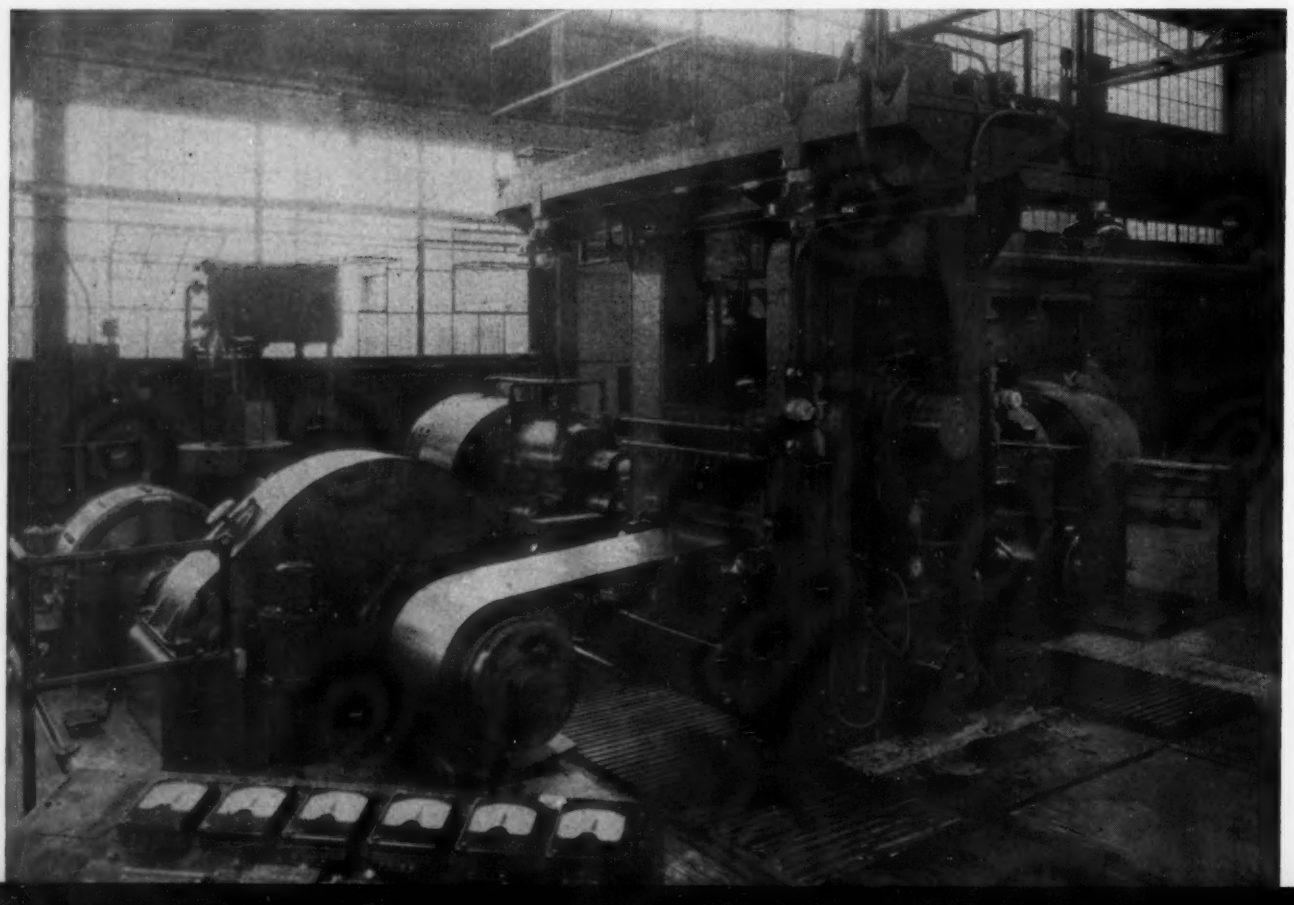
As matters now stand, Detroit Steel is the parent corporation, although it does no selling directly, this phase being handled by Reliance and Craine-Schrage. The Reliance group, incidentally, culminated from the integration of five local warehouses, the Chicago branch, for example, originally having been the Midwest Steel Co., the Worcester branch the Bancroft Steel Co., and the New Jersey branch the Century Steel Co.

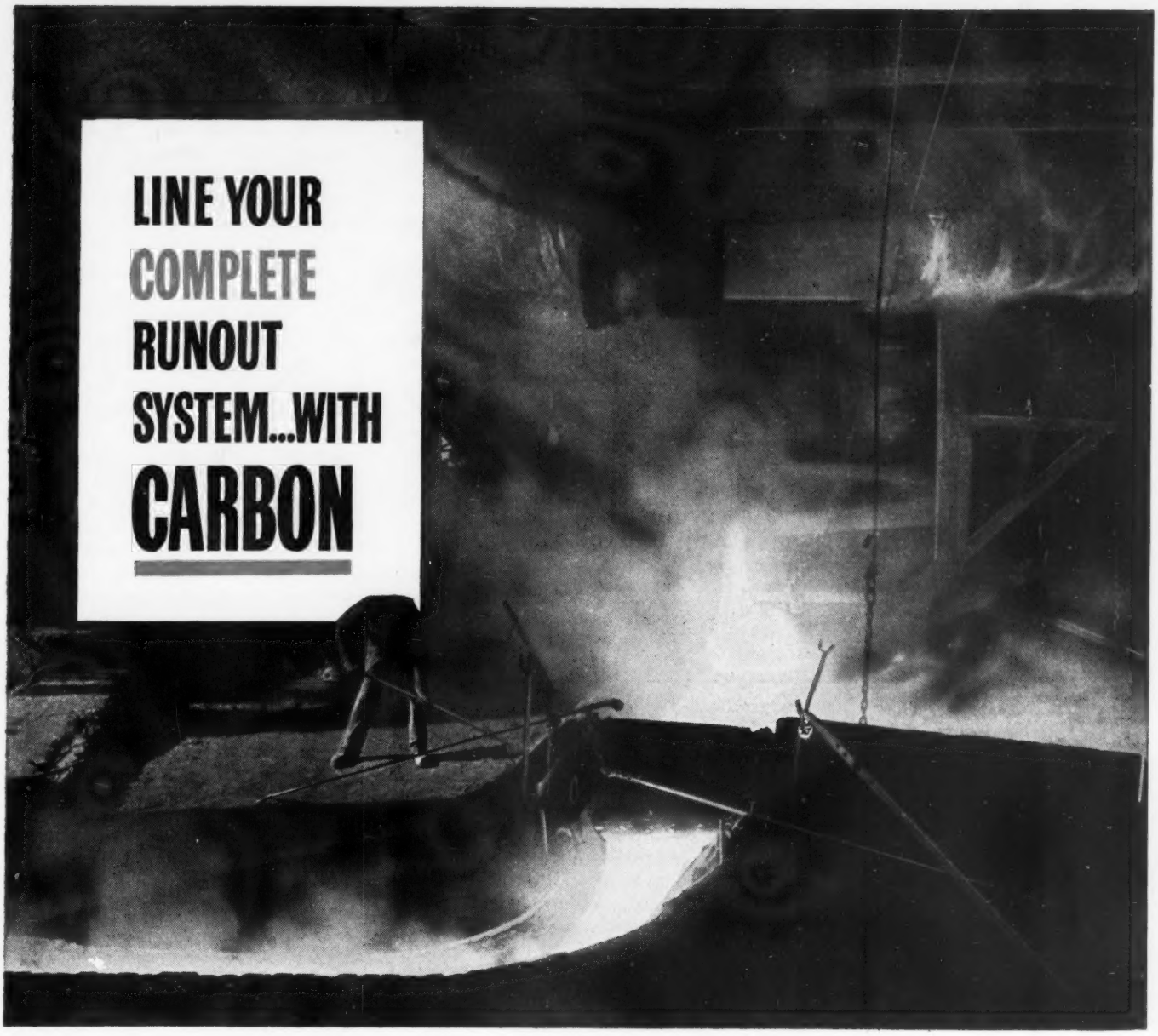
Headquarters were originally in Cleveland and in 1946 were moved to Detroit.

First 4-High Mill—Detroit Steel expanded its mill facilities steadily from its inception and pioneered several innovations in the field. In 1935, the first 4-high reversing type cold strip mill in the industry was installed. There were other cold strip mills, of course, but this was the first one designed and built for the specific purpose, and not converted from another type of mill. In 1940 and 1941, the company studied the possibilities of a semicontinuous type of pickler and finally installed equipment believed to be the first of its kind. Last year the plant was further improved by installation of which is understood the first convector-type bell annealing furnace in the industry.

At present, annual capacity of Detroit Steel is approximately 150,000 tons annually, limited naturally at the moment by the availability of hot-rolled material, which is purchased from outside steel producers. This tonnage is distributed to a wide range of customers, perhaps half in automotive production, the balance in dozens of other fields, such as electrical, furniture, appliances, etc. As is the

Pioneering in the adaption of 4-high reversing type mills to the production of cold-rolled strip, Detroit Steel Corp., now operates this 10-inch and 26 x 24-inch cold mill at its Detroit plant. Similar equipment is to be installed in the New Haven, Conn., plant





"National" carbon-block linings have for years been doing a fine job in blast furnace runout troughs —between taphole and skimmer plate.

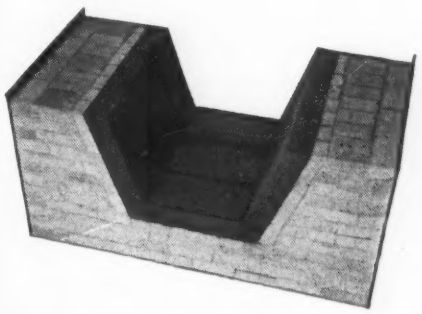
Why stop there?

Why not use carbon linings for the entire system, from furnace to ladle, and in the lead-in spouts of the pig machine as well? Carbon-block construction, shown at right, is recommended to the skimmer plate. Carbon bricks are most practical for the rest of the troughs.

Why use carbon?

Carbon outlasts other trough linings by months, even years. It is unaffected by thermal shock. Hot metal will not stick to carbon; so, if any skull is formed in the trough, it is readily removed. Furthermore, if you desulphurize in the trough, you'll find that carbon is highly resistant to desulphurizing agents.

Here is the recommended construction for a carbon-block trough between taphole and skimmer plate. Dark section is carbon. Light section is firebrick.



NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide and Carbon Corporation
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UCC

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Division Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

case with other steel suppliers, the company's sales divisions have attempted to follow a pattern of allocation on the basis of average purchases over the three years prior to the war. There has been some leeway for the addition of new accounts, but overall demand is some distance from being satisfied.

To Aid Eastern Users—Opening of the new mill at New Haven is expected to relieve the pressure on production to some degree at least, since it will mean an additional capacity of 60,000 tons per year. The new unit will have a rolling range identical with equipment at Detroit—up to 3/16-in. thick, up to 22 in. wide, in both coils and cut lengths, in all tempers and in carbon steel grades up to 0.80 per cent. Mechanical and electrical installations for pickling, annealing, rolling, slitting and edging will incorporte latest advances made in the design of this equipment.

The New Haven plant will bring mill facilities within trucking distance of eastern strip steel users and will place at their command considerably larger tonnages than are now available, at the same time relieving Detroit Steel from the high freight absorption which might be involved in shipping into the East from Detroit. Further than that it will permit diverting more tonnage from Detroit to midwestern consumers—an estimated 35,000 tons annually.

A little over a year ago, all administrative activities of Detroit Steel were centered in a new three-story administration building on South Oakwood avenue, adjoining the mill. Executive officer, accounting, credit, purchasing and personnel departments are housed in the new quarters and a consolidation of the administrative functions of all divisions was effected. A portion of the building has been set aside for a metallurgical laboratory.

Customers Come First—Officers include: Max J. Zivian, president; J. P. Pulte, executive vice president; Herbert Appleby, Philip P. Brown, Howard V. Clark and Anton G. Pulte, vice presidents; and Roger A. Yoder, secretary-treasurer.

An inkling of the volume of business conducted currently by this thriving "middle man" in the steel industry can be gained from the fact that net sales and commissions of the corporation last year exceeded $20 million, and this year may pass $26 million. The company is not resting on its oars sales-wise, in spite of the protracted sellers' market the industry is experiencing. Its officials realize some day the honeymoon will be over and by that time what is being done or undone today may have a jolting effect on sales and customer acceptance. A policy of close co-operation with all customers is the rule, including extra effort to conjure up tonnage in emergency cases, patient explanation to those whose needs cannot be fulfilled, and consultation with customers to determine both their short-range and long-range requirements and how Detroit Steel might help to fill them.

Antifriction Bearings

(*Continued from Page* 89)

by mounting bearings back-to-back, face-to-face or in tandem; in the latter mounting two bearings are opposed by another pair at the opposite end of the spindle and both groups are usually spring loaded.

Spring-loaded precision angular contact bearings give radial and axial rigidity at high speeds, and extremely close tolerances, while matched bores and outside diameters assure equal load distribution. For light weight at high speeds, the SKF assembly includes phenolic composition cages. In the back-to-back mounting, the pairs of bearings are preloaded by drawing the inner rings together to the preloaded position; outer rings are drawn together for preloading in the face-to-face mounting and in the tandem mounting the inner and outer rings are together in both the free and preloaded positions.

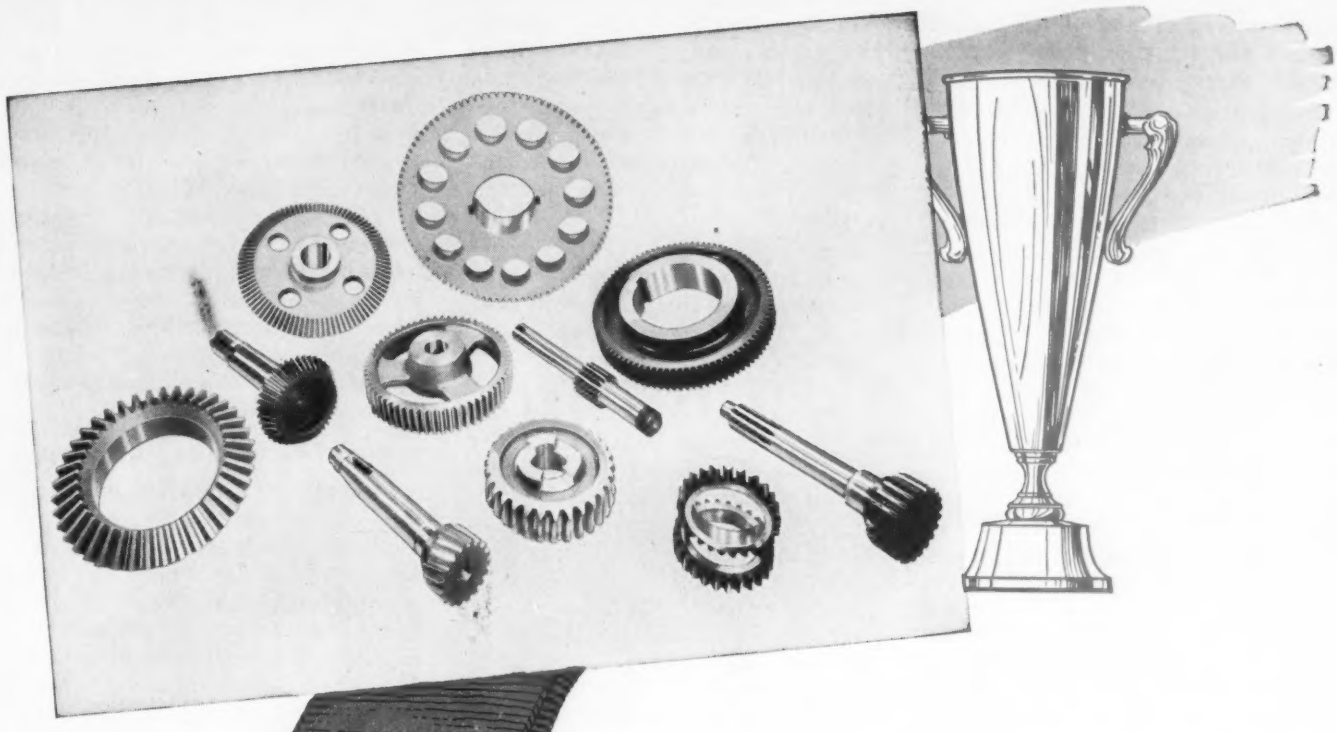
Depending on size, precision duplex bearings are produced with an initial contact angle of 15 to 20 degrees. This contact angle increases slightly when preloaded due to minute deformation at the ball and race contact area. There are standard preloads for each bearing size, but that selected for required spindle rigidity depends on the function a spindle must perform.

For milling, boring and turning operations, machine tool spindles should have low friction characteristics, but be of sturdy construction for high production, size control and desirable surface finish. As noted, carbide tools have increased cutting speeds and with the introduction of negative rake, increased power and spindle rigidity are added requirements. In addition to meeting rigidity requirements, antifriction bearings are improving spindle performance under the most exacting conditions.

In the SKF double row cylindrical roller bearing, the outer race roller path offers no resistance to axial movement of the spindle due to temperature change and the outer ring is mounted with a press fit in the housing to increase rigidity. A tight fit is assured when the inner ring and roller assembly are mounted on

TABLE I
BEARING DESIGNATIONS FOR SPINDLE APPLICATIONS
(SKF INDUSTRIES INC.)

Type of Bearing	Series	Suffix	Examples of Uses
Double Row Cylindrical Roller Bearings	NN 30 K	/C 021	Bearings for single spindle lathes, milling machines, and boring machines where extreme accuracy is not required. Single spindle machine tools in general.
		/C 481	Bearings for multiple spindle automatics.
		/C 4817	Most exacting applications, such as spindles in grinding machines and precision boring heads.
Thrust Ball Bearings	9	/C 05	Turning and boring spindles for exceptionally high thrust loads.
	511	/C 08	Accurate applications, such as spindles in grinding machines and precision boring heads. For normal thrust loads on turning and boring spindles.
Radial Ball Bearings	62	/C 782	Floating bearing mounted singly on spindle.
		/C 783/G	Duplex bearings at the rear of high speed lathes, milling machines, and grinding spindles, in combination with a double row cylindrical roller bearing at the front. NOTE: Use only when size not available in 72 C Series.
Angular Contact Ball Bearings	70C 72C	TC/C 78	Front and rear bearings mounted opposed, with one bearing at each end of a high speed grinding spindle. Rear bearing on lathe and milling machine spindles, when used in combination with a thrust ball bearing.
		TC/C 78/GD	Front and rear bearings mounted opposed with a pair of tandem bearings at each end of a grinding spindle. Duplex bearings at the rear of high speed lathes, milling machines, and grinding spindles, in combination with a double row cylindrical roller bearing at the front.
		TC/C 997/GD	Front and rear bearings on super precision grinding spindles.



FIRST

PEDIGREED GEARS

The "Ancestral Lines" of Illinois Gear reveal:

Men—a highly skilled personnel, craftsmen with thorough training, years of experience and pride in their product.

Machines—a modern plant tooled with the most advanced gear cutting, shaping, hobbing, planing and generating equipment.

Management—supervision capable of applying *Men* and *Machines* to produce the finest "Illinois Gear" in our history.

Send for Catalog No. 39.

Gears for Every Purpose

ILLINOIS GEAR & MACHINE COMPANY

CHICAGO 35, ILLINOIS

a tapered spindle seat, eliminating creep between the inner ring and the spindle under operating loads.

Internal clearance of the bearing is removed by expanding the tapered bore inner ring on the spindle, thus establishing precisely correct internal relationship of the rollers and roller paths. In the assembly of this bearing, cylindrical rollers, which are equal in length to diameters, are lapped to closest precision, all points on the circumference having the same peripheral speed, eliminating sliding. The equal length-diameter permits accurate guiding without excessive rubbing against inner ring flanges.

Inner Ring Mounted on Arbor

During finish grinding and honing of roller paths, inner ring of the cylindrical roller bearing is mounted on a tapered arbor and both roller paths are ground and honed simultaneously, assuring equal diameters; outer ring roller path is also honed. The one-piece bronze cage is machined and the two rows of rollers are staggered. This arrangement, coupled with the greater number of rollers, gives efficient load distribution and bridging effect is eliminated.

The thrust ball bearing in this spindle assembly stabilizes the unit axially at normal speeds and is designed to carry axial loads only. Usually two thrust bearings are mounted close together, contributing to rigidity, low friction and low temperature operation. Bearings need not be adjusted for varying loads and speeds; operating temperature changes have virtually no effect on the original setting. For medium and low speed applications, single or multiple spindle lathes, employment of two thrust ball bearings gives maximum axial rigidity.

If the thrust load is predominantly in one direction, stabilization of the spindle axially is also possible by opposing a thrust ball bearing with an angular ball bearing, the thrust bearing taking the principal thrust load. A heavy drilling or boring operation completed during the cut-off cycle requires extreme axial rigidity and if this condition is not present, location of the cut-off may not be controlled accurately and face of the work piece may not be flat.

Centrifugal and gyral forces acting on the balls govern the limiting speeds of thrust ball bearings and the spinning of a ball in the direction of the gyratory moment is resisted by the friction caused by the ball load. Thrust ball bearings, therefore, should be preloaded beyond a minimum value to permit resistance to the tendency of the ball to spin. The limiting speed of a thrust ball bearing in some high speed applications, such as high speed boring heads, may be exceeded, making the selection of duplex angular contact ball bearings necessary.

Exacting requirements for grinding make low operating temperature, stability and accuracy important factors in machine and spindle design, ranging from high-speed bore spindles to heavy-duty roll grinders. The same precision tolerances in balls and rollers, rings, rolling paths, containers and care in assembly necessary in milling and turning units are as important in grinding spindles. Elimination of vibration at high speeds is an important detail in design of most grinding spindles.

On high-speed bore grinding spindles and other extremely accurate applications, when angular contact ball bearings are mounted in tandem and spring-loaded, bores and outside diameters should be matched. This gives identical shaft and housing fits for each bearing and when mounted the two share the load equally. If fit is not identical, one bearing may carry the major part of the load; also variations in the operating accuracy tend to result in vibration and less smooth running.

Light Loads Use Single Bearing

Where load is comparatively light, single angular contact bearings, spring-loaded, instead of two bearings, are frequently used at each end of the spindle; single bearings eliminate the problem of sharing the load equally. Mountings of this type are often selected for bore grinding spindles.

Cylindrical roller bearings for exacting applications are produced to C 4817 specification, honing making roller tracks geometrically accurate surfaces; rollers are lapped and diameters matched in sets. Antifriction bearings in most instances are assembled in air-conditioned departments, free from microscopic dust, inspected and packed. In the assembly of spindles, similar conditions should prevail; for smooth operation, bearings and adjacent spindle parts should be kept absolutely clean.

Major portion of complaints as to bearings emanating from war plants are traceable to faulty handling in assembly of finished parts. Bearings, inspected, assembled, packed and shipped under the most exacting conditions were often opened, unwrapped and left on assembly benches in rooms laden with dust for hours and days.

Frequently all precautions taken for the maintenance of high precision were nullified and inexperienced war-workers blamed the bearings for later trouble with some of the most delicate machines and instruments. Numerous machine tool builders maintained a separate spindle assembly room for maximum efficiency in assembling. Extreme accuracy is built into the bearing at the plant of manufacture, in every production step with the aid of precision machines and gages, and this accuracy should be preserved.

Temperature Rise May Limit Speed

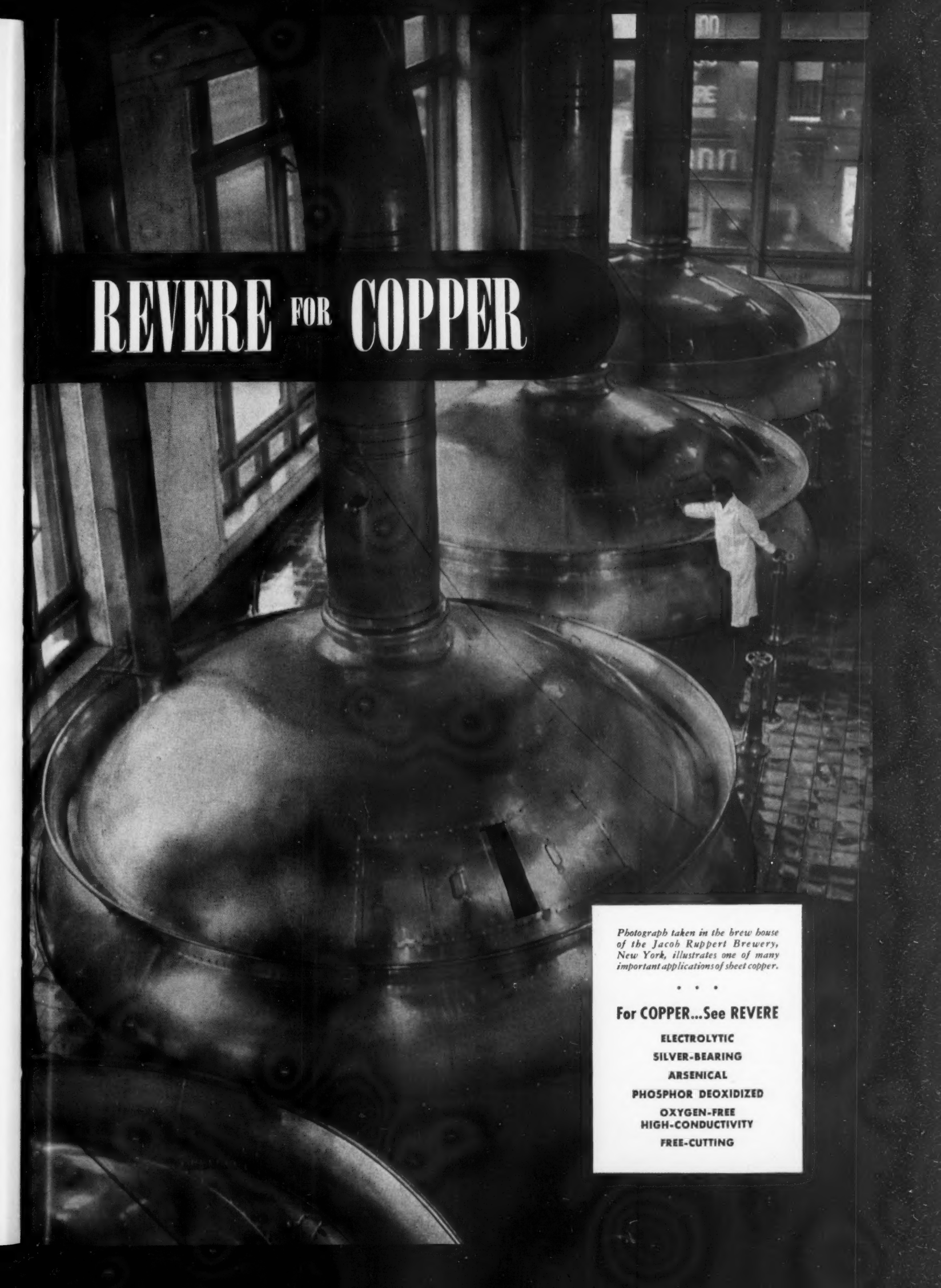
Strength of a bearing steel, and thus its capacity, is not usually effected until any rise in temperature is above that at which lubrication troubles would normally develop. The speed of a bearing, therefore, is usually limited by temperature rise within a bearing operating at high speeds. In operation, temperature of a bearing is primarily dependent on the bearing friction and this friction is a measure of the ability of bearings of various types to withstand high speeds.

Radial ball, cylindrical roller and other antifriction bearings have very low friction and therefore can be operated at higher speeds. Lubrication is a factor in speed and will be discussed separately in this series later.

Cutting tool loads, combined with driving gear or belt load determine the load on spindle bearings, and, in making the proper choice of bearing these should be determined as accurately as possible. Thrust load from a tailstock may greatly exceed the thrust load from the tool and this should be approximated, if a tailstock is used in the machine design.

Frequently a radial type bearing has to carry loads of axial as well as radial components. The outer ring may also rotate in relation to the load and it is then necessary to convert these forces and conditions of rotation into an equivalent load. This equivalent is that constant stationary radial load, which if applied to a rotating inner ring, would give the same life the bearing will attain under the actual conditions of load and rotation.

Angular contact ball bearings are rated as radial bearings, but when one is mounted unopposed, the radial load component should not exceed that of the thrust load. A pure radial load is distributed among nearly half the rolling elements in a radial bearing, but if a bearing supports a pure thrust load, the external load is equally distributed among rolling ele-



REVERE FOR COPPER

Photograph taken in the brew house of the Jacob Ruppert Brewery, New York, illustrates one of many important applications of sheet copper.

• • •

For COPPER...See REVERE

ELECTROLYTIC

SILVER-BEARING

ARSENICAL

PHOSPHOR DEOXIDIZED

OXYGEN-FREE HIGH-CONDUCTIVITY

FREE-CUTTING

REVERE COPPER

"THE METAL OF INVENTION"

Revere considers its copper "The Metal of Invention" because it is so easily adaptable to such a wide variety of uses, applications and processes. Its easy workability sets the designer free; complicated parts and equipment can be produced easily and economically, while its many other inherent qualities make it invaluable.

Copper, however, is more than just *copper*. By making slight changes in composition, Revere copper is produced in six different types, each having special characteristics to meet varied needs with exactitude. If you need just the right copper to fill your requirements as to fabrication or use, come to Revere.

General Qualities. One of copper's most important qualities is its ability to resist corrosion. It withstands atmospheric conditions as satisfactorily as any available commercial metal, and in addition it is substantially immune to attack by a large number of chemicals . . . Copper also has high electrical and thermal conductivity . . . Fabricators find its hot and cold working properties unsurpassed. In cold working, reductions of 90% may be achieved without intermediate annealing. In hot working, temperature is not critical, the range of maximum plasticity being between 1200° and 1650° F. . . . Copper may be easily drawn, stamped, and formed by machine or hand, and easily soldered, polished, plated . . . Most coppers can be welded by gas, carbon arc or metal arc.

ELECTROLYTIC COPPER

Contains 99.9% copper, minimum.

Produced in sheet, strip, plate, rod, bus bar, tube, forgings.

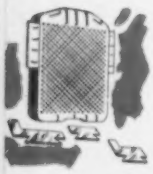
Typical uses: Bus bar, commutators, roofing, flashing and gutters, kettles, vats, chemical and distillery equipment, forgings, printing rolls.

Also known as tough-pitch copper, this is the most widely-used type of Revere copper, combining as it does high electrical and thermal conductivity with resistance to corrosion. Working properties: Cold working, hot working, soldering, polishing—excellent. Machining—fair. Welding—deoxidized copper preferred.

SILVER-BEARING COPPER

Copper 99.9% minimum; silver, 8 to 30 oz. per ton.

Produced in sheet, strip, rod, tube.



Typical uses: Radiators, gaskets for spark plugs, commutators, and other parts subjected to high temperatures, wherever copper is required to have high annealing qualities.

The silver content of this copper raises its annealing temperature, so that the metal resists softening at 500° to 700° F. Electrical and thermal conductivity are the same as Electrolytic copper. Working properties: Cold working, hot working, soldering, polishing—excellent. Machining—fair. Welding—deoxidized copper preferred.

ARSENICAL COPPER

Copper 99.45%, arsenic 0.35%, phosphorus 0.025%.

Produced in tube form only.

Typical uses: Tubes for condensers and heat exchangers.

This special copper has lower electrical and thermal conductivities than Electrolytic. Due to its resistance to the chemical action of certain corrosive media, arsenical copper has found some application in tubes for condensers and heat exchangers. Working properties are the same as Electrolytic.

PHOSPHOR DEOXIDIZED COPPER

Copper 99.9%, phosphorus 0.025%.

Produced in sheet, strip, plate, rod, tube.

Typical uses: Water, oil and refrigeration lines; heat exchangers, stamped and spun products and parts, welded construction of vats, tanks, stills and similar equipment.

Has better forming and bending qualities than Electrolytic, hence its selection when severe forming is required. It is also generally preferred for welding applications because at welding temperatures it resists embrittlement by reducing gases. Working properties: Cold working, hot working, soldering, polishing—excellent. Machining—fair. Welding—excellent.

OXYGEN-FREE HIGH-CONDUCTIVITY COPPER

Copper 99.9% minimum

Produced in sheet, strip, rod, tube.

Typical uses: Drawn and stamped parts; metal-to-glass seals, as in vacuum tubes; equipment operated at elevated temperatures in presence of reducing gases.

Revere Oxygen-Free Copper has excellent drawing and forming properties, similar to those of Phosphor Deoxidized, and retains the highest electrical conductivity. Because of its freedom from oxygen it does not become embrittled when exposed to reducing gases at elevated temperatures, as in forming seals with glass and similar applications. It is less suitable than Deoxidized Copper for general welding purposes because of the absence of residual deoxidant. Working properties: Cold working, hot working, soldering, polishing—excellent. Machining—fair. Welding—neutral flame or arc.

FREE-CUTTING COPPER

Copper 99.75%, tellurium 0.70% maximum.

Produced in rod, extruded shapes.

Typical uses: Screw-machine products, electrical parts requiring accurate machining, welding torch tips, parts for electronic tubes.

Revere Free-Cutting Copper is similar in qualities to Deoxidized Copper, but in addition has remarkable machinability, being rated in excess of 70% of free-cutting brass. Parts produced from it have close tolerances, an exceptional finish, sharp threads. Working properties: Cold working, hot working, soldering—good. Machining, polishing—excellent. Welding—not recommended.

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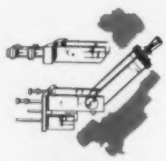
Copper 99.9%.



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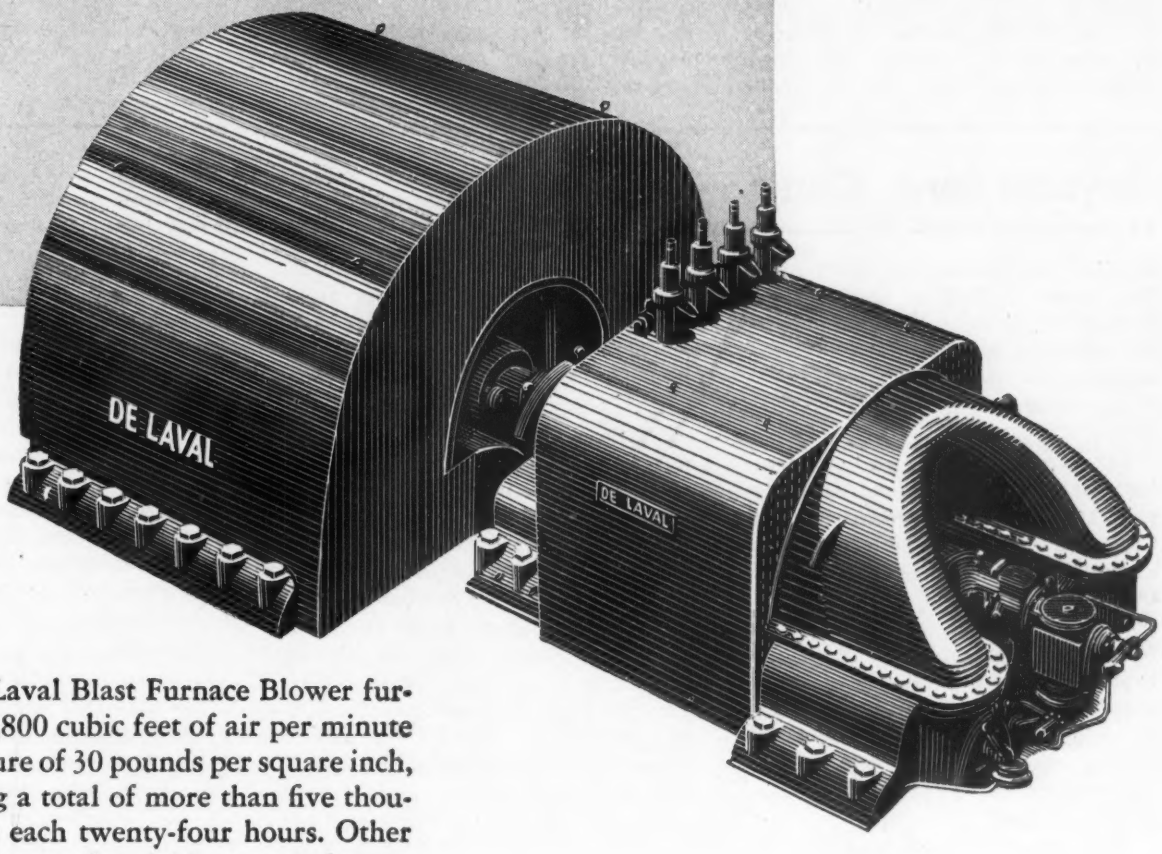

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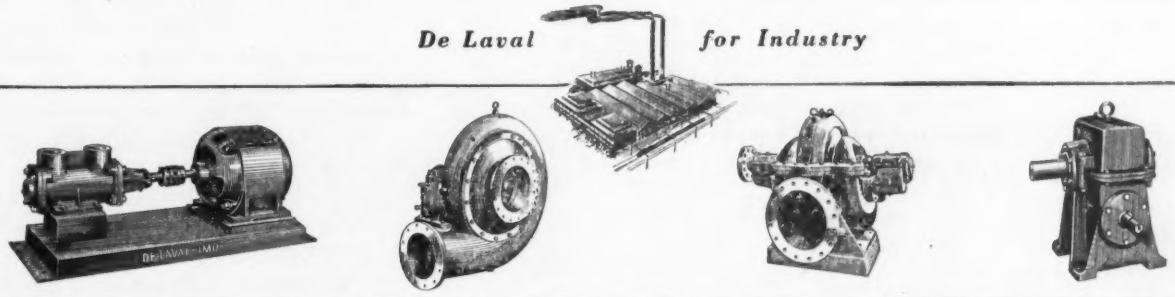

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ments. If a bearing is subjected to a combination of radial and thrust, calculation of the load on the most heavily loaded rolling element is more difficult, depending on internal bearing clearance and type.

Radial clearance is important for radial bearings; clearance is the amount one ring moves in relation to the other under a small given measuring load in a radial or axial direction. When the bearing has been mounted and has reached temperature equilibrium, radial clearance in ball bearings is generally held near zero, but a moderate preload is not usually particularly harmful.

Deflection is less under load in roller bearings, a small internal clearance operates against the development of excessive heat at high speeds. Roller bearings, however, are generally preloaded for normal speeds for maximum rigidity. In single-row angular contact bearings one is opposed by another to control internal clearance.

Chatter may result in machine tool spindles if there is loose fit between any bearing ring and its shaft or housing seat. Mounting is an all-important factor in spindle performance and regardless how accurate a bearing may be made, operation will be unsatisfactory if shafts or housings are not truly circular.

Bearing housings should be carefully cleaned of metal chips, filings and other matter and the bearing kept in the original wrapping until it is to be installed. Slushing grease in which bearings are packed is also a lubricant, and should not be removed. If absolutely necessary to clean the bearing before mounting, filtered water-free kerosene may be used and fresh lubricant applied immediately.

Oxyacetylene Cutting—*Continued from Page 97*

reaction obtained on very high-alloy, heat-resistant ferrous materials, is explained on much the same basis as stainless steels although other alloying elements are present in some cases which form refractory oxides.

In all materials mentioned, the burning base metal itself supplies considerable heat to sustain the cutting reaction since both iron and chromium form their oxides exothermically. However, in the case of nonferrous metals such as nickel, Monel, and copper-base alloys, the heat of formation of the oxides is quite low in comparison with iron or chromium so that an oxyacetylene cutting reaction is not self sustaining without the addition of another source of heat.

Here again, heat obtained from the combustion of iron-rich powders is sufficient to maintain the reaction; in this case there are definite limitations on the thickness which can be cut, whereas on stainless steel or cast iron this limit has not yet been reached. Considerable further development is being done on nonferrous materials which will undoubtedly raise the thickness limits.

It will be seen then, that the use of a combustible powder provides a versatile tool not only for cutting and scarfing of all types of stainless steels but also for cast iron, high-alloy, ferrous and nonferrous materials.

In operation, the process is similar to carbon steel cutting and scarfing with the exception of the method of starting, and the height of the nozzle above the work. In carbon steel cutting it is customary to adjust the nozzle height so that the inner cones of the preheat flame just clear the work. In the powder process the nozzle is carried higher above the work to permit powder to be brought up to ignition temperature and to start burning prior to impinging on the work surface.

For cutting operations this means that the nozzle will be from 1 to 2 inches off the work, depending on the thickness to be cut and the nozzle size used. For scarfing, the nozzle may be 2 to 3 inches off the work. In scarfing, the rake angle of the nozzle is less and speeds are lower than used on carbon steel, but in other respects the technique is comparable.

Starting method for cutting differs in that customary preheating to bring the steel up to its ignition temperature is completely eliminated. The high heat of combustion created by the iron-rich powder makes it possible to obtain flying starts at the desired cutting speed regardless of the leading edge contour. This feature is particularly adaptable to automatic production bar cutting equipment.

General operating data for drop cuts on clean 18-8 stainless steel are shown in table. For many machine-cutting applications it is possible to cut at considerably greater speed than indicated while for hand cutting, lower average speeds may result. In general, however, cutting speeds and cutting oxygen pressures are comparable to those that would be obtained on carbon steel.

For thicknesses over 1 inch it is customary to use a nozzle one size larger than that which would be used on carbon steel of the same thickness. It has been found that these conditions apply with little or no change to any stainless steel composition from the 12 per cent chromium grades to 25 per cent chromium, 20 per cent nickel grade. However, on very high-alloy ferrous materials it is necessary to increase the powder flow and decrease the cutting speed but in less than direct proportion to the increase in alloy content.

Operating conditions for cast iron are approximately the same as those listed in the table, with the exception that cutting speeds are about one-half those for the same thickness of stainless. Cutting speeds for nonferrous metals such as nickel and Monel are approximately 25 to 50 per cent of those for stainless steel and powder flows correspondingly higher. Best results on nonferrous materials are obtained on plate 1 inch thick or less, although cuts have been made up to 4 and 5 inches thick.

Quality of cuts obtained on stainless steels approaches that on carbon steel but the cut surface has a rather pebbly appearance as may be seen in Fig. 1, possibly due to selective oxidation of the various

POWDER-CUTTING DATA

CLEAN 18-8 STAINLESS STEEL

Thickness, in.	Nozzle size	Cutting Oxygen, lb. per sq. in.	Powder Consumption, lb. per hr.	Cutting Speed, in. per min.
¼	4	50	15	24
½	6	50	18	20
1	6	50	18	15
2	8	50	18	11
4	10	50	18	7
6	12	50	22	5
8	14	65	24	4
10	16	65	24	4
12	20	75	30	4
14	20	75	45	3
16	24	75	45	3
18	24	75	45	2
20	24	75	45	2

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NATCO A-33A Combination Hand and Foot and Air Oil Feed Machine illustrated can be arranged for both light precision drilling and tapping.

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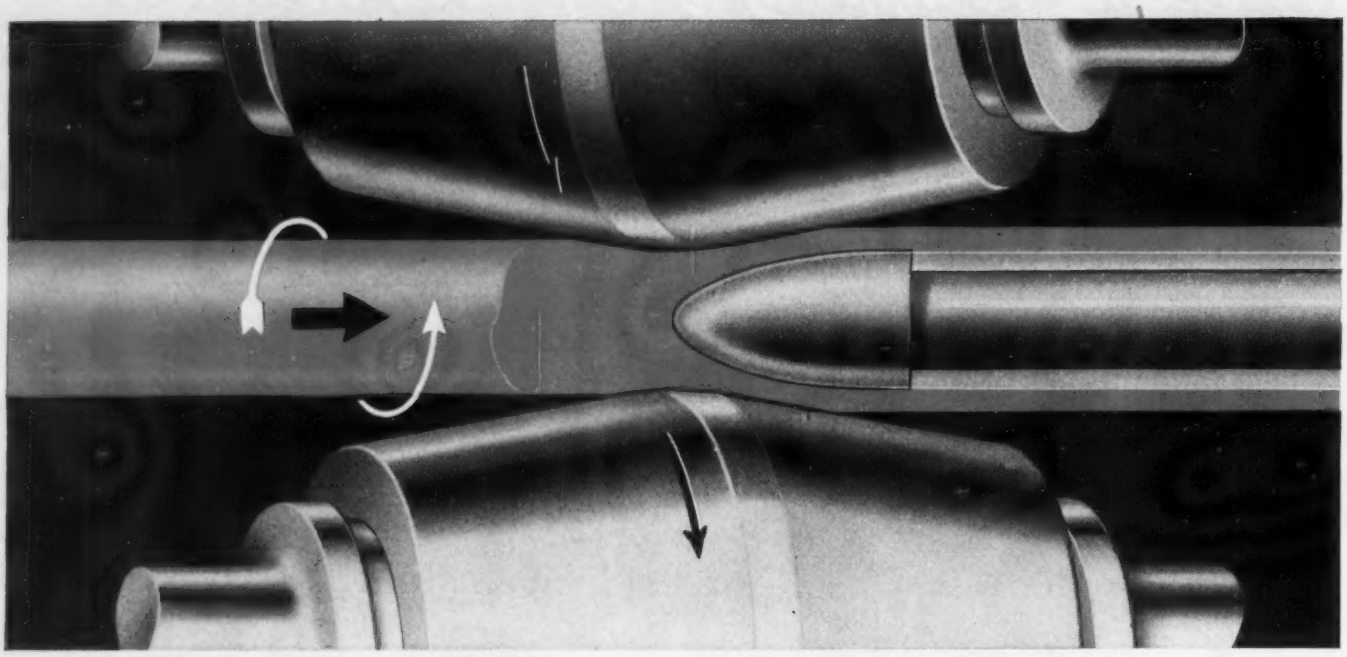

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First, the piercing of Timken tubing is basically a forging operation. Red hot billets are worked between the rolls and forced over the piercing point with a spiral kneading action that thoroughly works the metal from the inside, from the outside, and throughout the entire cross section.

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If you make hollow cylindrical parts, chances are you can improve product quality and decrease material and machining costs by using Timken seamless tubing. Don't overlook this opportunity. Let our Technical Staff make an "on-the-job" analysis of your problem. No obligation. Write Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.

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alloy components of the material. Even on high-alloy materials the cut quality remains surprisingly good.

Immediately after completing a cut the base metal is covered with a relatively heavy scale which tends to loosen or pop off on cooling. Scale removal can be accelerated by cooling the piece with water immediately after cutting, provided of course that the material is nonhardenable. There is also a small ridge of powder left on the top edge of the section which can easily be knocked off to expose a very square top edge.

As in any oxyactylene cutting reaction, the best effect on the base metal must be considered. Naturally, if the material being cut is of a hardenable nature such as a high-carbon straight chromium stainless steel or a high combined-carbon content cast iron, the material should be preheated to prevent any cracking or checking on the cut surface. On unstabilized stainless steels there is the further consideration that these materials are susceptible to carbide precipitation or loss of corrosion resistance when heated within a temperature range of approximately 1000 to 1500° F.

Critical Temperature Range Varies

Obviously, in any oxyacetylene cutting reaction there is a temperature gradient from something above the melting point at the kerf surface to base metal temperature, which will include the critical range. Width of this critical temperature range and the distance from the kerf surface will vary depending upon speed of cutting, preheat conditions, metal thickness, and mass of metal available to provide quench action.

On any cut edges which are to be subsequently reheated for further working, this presents no problem since subsequent treatment will eliminate the heat affected zone. If the cut edge, likewise, is to be subsequently welded, no new problem is encountered since heat input from welding operation removes the carbide precipitation zone caused by cutting. However, the welding itself creates a larger zone of carbide precipitation farther back in the base metal. This is corroborated by tests which have actually shown that the zone of carbide precipitation adjacent to a powder cut and welded edge is identical to that on a machined and welded edge.

If a cut edge is not to be subsequently welded, consideration must be given to the manner in which the piece will be placed in service. When used under severely corrosive conditions, the piece should either be heat-treated to eliminate carbide precipitation, or sufficient allowance made on the cut edge to permit machining back to unaffected metal. If, however, the piece is to be placed in service where an as-welded stainless structure is satisfactory, obviously the powder-cut edge will be suitable. Columbium and titanium stabilized stainless steels will be unaffected by powder cutting.

Apparatus required for powder cutting or scarfing is relatively simple and inexpensive. A common piece of apparatus that is required in both cutting and scarfing is the powder dispenser, such as shown in Fig. 2. This is essentially a pressure vessel with a powder ejector built into the bottom flange. It operates entirely on a small flow of compressed air through the dispenser, the powder being picked up by the air flow through the ejector and carried through ordinary rubber hose to the blowpipe. A shut-off valve at the blowpipe controls the flow of powder.

For hand scarfing, a 44-inch long powder blowpipe is used. The blowpipe is of the conventional medium-pressure type but in addition to the usual two-hose hookup, a third passage is built in for the powder. The cutting valve lever actuates both the powder and cutting oxygen valves, the sequence being so arranged that the powder comes on slightly before the cutting oxygen to insure a flying start. In the scarfing nozzle, the powder is introduced into the cutting oxygen stream within the nozzle.

Hand cutting blowpipe is similar to scarfing blowpipe in all respects except that it is 28 inches long. A two-piece hand powder cutting nozzle is used with this blowpipe in which the powder is blown into the cutting oxygen stream from a number of converging powder jets external to the preheat flame circle.

Conventional Blowpipes Used

For machine powder cutting, conventional blowpipes and nozzles are used by applying a powder cutting attachment as shown in Fig. 4. This attachment consists of a powder shut-off valve, tubing, and a powder nozzle which surrounds and retains the conventional oxyacetylene nozzle in the blowpipe. Front end of the powder nozzle has six powder ports from which powder converges on the oxygen jet.

Attachments of this general construction are built for the complete range of standard blowpipes and nozzles and are capable of cutting stainless steel ranging from ⅛-inch to 26-inches in thickness. At no time, in either the hand blowpipes or machine cutting attachments, does the powder come in contact with the oxygen or acetylene passages.

Points of use of the process fall into three main classifications: Steel mills, foundries and fabricators. Of these the steel mill undoubtedly has the most varied applications ranging from scarfing and cutting of stainless ingots, blooms, slabs, and billets, cutting of cast iron ingot molds for reclamation or scrapping, maintenance on blast furnaces and hot metal cars, and scrapping operations. It is beyond the scope of this article to discuss in detail all these applications but a number of interesting examples will be cited.

Scarfing Conditions Ingots

In rolling large stainless ingots, it is often found that cracks will start to form particularly at the corners after several passes through the blooming mill. It is necessary to discontinue further rolling until these defects and corner cracks, which may be up to 2 or 3 inches deep, have been removed. By powder scarfing the complete surface of such a bloomed ingot weighing approximately 25,000 pounds can be conditioned by one man in 8 hours while to do this job by grinding would require six to eight times as many hours. Generally these bloomed ingots are too long to be placed in soaking pits prior to further rolling unless the hot top is removed. It is on this hot top removal that the heaviest stainless steel cutting is encountered, the thickest to date being 26 inches. Ordinarily hot tops are about 18 inches thick and are cut at an average speed of 2 inches per minute.

In steel mills which pour small ingots it is often found that the ingot surface is of a porous character. By scarfing the ingot surface prior to rolling, subsequent conditioning is generally reduced. It is possible to scarf a heat of 1000-pound ingots consisting of 22 to 24 ingots, in one 8-hour turn, using two blowpipes. An ingot in the process of being scarfed is shown in Fig. 3.

In many plants powder cutting is used for cutting slabs to smaller sizes for plate rolling. Slab thicknesses generally range from 4 to 7 inches and cutting speeds of 14 to 6 inches per minute, respectively, have been reported.

There are a number of cast iron cutting operations in the steel mill. One of the best of these is the reclamation of ingot molds. In casting ingot molds, sections of the green sand mold sometimes break away with the result that a protuberance is

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mold must be scrapped. With powder cutting it is now standard practice to reclaim all such molds at a very considerable saving to the user. Process is also used for removing flash from bottom of mold as shown in Fig. 5.

When ingot molds have reached the end of their useful life they are broken up to charging box size in a skull drop. One steel mill simplifies this work by making a nicking cut with a hand powder blowpipe along the desired line of break prior to cracking. Since complete penetration is not required, high cutting speeds are possible. Using a No. 16 nozzle, a 2-inch deep nick may be made at a speed of 11 inches per minute.

In the stainless steel foundry, the process has found considerable application in the removal of risers. The process is particularly advantageous compared with carbon-arc cutting on risers over 2 to 3 inches in diameter. In most foundries the work is done with the hand blowpipe because the odd shapes, varied location of risers and gates, and small number of any one type of casting preclude the use of a mechanized setup.

A typical riser removal job is shown in Fig. 6 on a part for a centrifugal pump where the five risers, which varied in nominal diameter from 2 to 4 inches were removed in 4 to 5 minutes cutting time. In some foundries small powder-scarfing nozzles are used to wash the riser pad down to the cutting contour and eliminate the major part of finish grinding. Another advantage of powder cutting is that rigid cleaning practices prior to riser removal are not required since the powder-oxygen jet has the ability to pentrate through mold sand which often adheres at the junction of the riser and casting.

In certain specialized applications, where one type casting is produced continuously, mechanization is possible with considerable savings over hand operation since greater speeds can be obtained and the cut can be made much closer to the casting.

Fabricators represent the largest number of individual users of the process. Since the powder cut can be made very close to or right on the layout line, final clean up is minimized. All operations common to the carbon steel fabricating shop, such as beveled-edge preparation, shape-cutting, stack cutting, piercing of plate up to 1½ to 2 inches thick and cutting inside circles or shapes, gouging and other work of a general nature can be performed with the powder process.

In a large chemical plant it was desired to weld a 3 foot extension into large stainless steel autoclaves 15 feet high by 8 feet outside diameter. Because of the shape and the supporting members on the side it was not practicable to revolve the unit into the horizontal position. Cutting was done with the autoclave standing in an upright position rotating past a fixed blowpipe. With powder cutting, it was possible to completely prepare the unit for welding in less than 1 day with an actual cutting time of less than 1 hour per unit.

Cutting of Monel is being done on a production basis is some shops. In one particular case it was desired to shape cut 2000 Monel fins far a special pressure vessel. These fins were ½-inch thick, elliptical in shape, with approximately 33 lineal inches of cutting on each fin. Using a powder cutting attachment with a No. 6 nozzle operating at 30 pounds per square inch, cuts were made at 5½ to 6-inches per minute or a cutting time of approximately 6 minutes per fin. The cut quality was practically identical with that obtained on 18-8 stainless steel.

From data presented at 47th annual convention, International Acetylene Association. Cincinnati.

Gas-Diesel Development Reduces Fuel Costs

Operation of gas-diesel engines at less than full load, previously not economically sound, now is possible according to Cooper-Bessemer Corp., Mount Vernon, O., who have improved this type of engine so that fuel costs are reduced by 10 per cent under former gas-diesel operation at full load and as much as 42 per cent at one-quarter load. Fuel records for a 1440 horsepower supercharged engine in a power plant at Cherokee, Okla., reportedly have shown even lower consumption figures after extended operation.

It has been found, the company states, that as the load was decreased below the full load point, efficiency decreased rather rapidly. At slightly under the full load the gas-diesel is said to become less economical than the straight diesel and at from one-half to one-third load, it becomes less efficient than the spark-ignited gas engine.

Cooper-Bessemer engineers found that the reason the gas-diesel engine was economical at light loads was due to leanness of mixture. Lighter loads made it more difficult to burn the charge with a pilot injection of fuel oil; consequently a large per cent of the gas went up the exhaust stack unburned.

Cooper-Bessemer now states that it has found a way of reaching that gas and burning it, making this engine show a lower Btu consumption at any and all loads than the oil diesel.

New Welder Makes Clad Pressure Vessel Plates

More consistent welding voltage, considerable power savings and higher current flow into the work for shorter periods typify a newly developed type of welder for the manufacture of composite or clad plates used in pressure vessels and a new variation of the slabbing process for bonded composite plates. The problem of shunt currents and contact resistance is overcome, accordinng to Babcock & Wilcox Co., New York, developer of the process. Two rotary type transformers in the new mechanism are used and a pulsating current to the weld is obtained by means of a pulsation timer. Plates are bonded by either spot welds or overlapping spot welds, commonly called seam welding.

In seam welding, the clad layer is usually made up of three layers, two of the alloy material and one of pure nickel, the latter preventing carbon migration and increasing the total area bonded to the steel. It is stated that bonded plates may be formed and handled without many special precautions.

An integral transformer places machine rolls directly within the secondary current carrying members of the transformer and therefore gets to the work its full output with a minimum loss. Reduction of the overall kilovolt-ampere demand by one-half is said to be possible, efficiency and latitude of application at the same time becoming measureably greater. Reactance characteristics are reportedly extremely low because of close coupling of power source to the work, resulting in a more consistent welding voltage.

Tension tests on the bonded plate have shown an average of 24,000 pounds per square inch in shear and failure at the line of fusion of the fillet weld is on an average of 30,000 pounds per square inch.

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PRODUCT	TYPICAL COMPOSITION	APPLICATIONS
ALSIFER	Aluminum.....20% Silicon.....40% Iron.....40%	Used principally as a steel deoxidizer and for grain size control.
FERRO CHROMIUM High Carbon Grade	Chromium....66-70% Carbon.....4-6%	For wrought constructional steels and steel and iron castings.
Iron Foundry Grade	Chromium....62-66% Carbon.....4-6% Silicon.....6-9%	For alloyed cast irons. Readily soluble as a ladle addition at the lower temperatures of cast iron.
Low Carbon Grades	Chromium....67-72% Carbon..06%, .10%, .15%, .20%, .50%, 1.00% and 2.00% max.	For low carbon chromium steels, especially those with high chromium content, such as stainless and heat-resistant types.
FERRO SILICON 25-30% Grade	Silicon.....25-30%	Deoxidizer for open hearth steels; also for high silicon, corrosion-resistant iron castings.
50% Grade	Silicon.....47-52%	Used as a deoxidizer and for the addition of silicon to high silicon steels, for springs, electrical sheets, etc. Pulverized form used as ladle addition to cast irons for silicon content and graphitization control.
75% Grade	Silicon.....74-79%	For high content silicon steels, such as spring steels, sheets and forgings of high magnetic qualities for electrical apparatus.
High Silicon Grades 80-85% 85-90% 90-95%	 Silicon.....80-84.9% Silicon.....85-89.9% Silicon.....90-95%	 For high content silicon steels where small ladle additions are used for required silicon content. Also for manufacture of hydrogen by reaction with caustic soda and production of magnesium by the Pidgeon process.
FERRO TITANIUM High Carbon Grade	Titanium.....15-18% Carbon.....6-8%	Final ladle addition to control "rimming" action and to clean effervescing steel. Final deoxidizer and scavenger for steel castings and fully killed ingot steels.
Medium Carbon Grade	Titanium.....17-21% Carbon.....3-4.50%	Often preferred to the High Carbon Grade as a final ladle addition to very low carbon rimming or effervescing steels.
Low Carbon Grades 20-25% Ti Grade	Titanium.....20-25% Carbon...max. 0.10% Silicon.....max. 4% Aluminum max. 3.50%	Carbide stabilizer in high chromium corrosion-resistant steels of extremely low aluminum content. Deoxidizer for some casting and forging steels.
40% Ti Grade	Titanium.....38-43% Carbon...max. 0.10% Silicon.....max. 4% Aluminum...max. 8%	Carbide stabilizer in high chromium corrosion-resistant steels, where smaller ladle additions are desired and extremely low aluminum content is not essential.
VANADIUM METAL 90% Grade	Vanadium....91.15% Aluminum.....2.25% Silicon.....0.50% Carbon.....0.17%	For special iron-free (nonferrous) or low iron alloys or low impurity ferrous alloys.
95% Grade	Vanadium....95.18% Aluminum.....2.00% Silicon.....0.27% Carbon.....0.40%	Principally for research on the properties of pure alloys, where very low iron content is essential.

PRODUCT	TYPICAL COMPOSITION	APPLICATIONS
FERRO VANADIUM Grade "A" (Open Hearth)	Vanadium....35-40% Silicon.....max. 12% Carbon...max. 3.50%	For low percentage vanadium content of rolled, forged or cast constructional steels. Also used in vanadium cast irons.
Grade "B" (Crucible)	Vanadium....35-45% Silicon...max. 3.50% Carbon...max. 0.50%	For tool steels and special high vanadium steels in which required limits for carbon and silicon are narrow.
Grade "C" (Primos)	Vanadium....35-45% Silicon...max. 1.25% Carbon...max. 0.20%	For tool steels and special steels requiring high percentages of vanadium and exceptionally low carbon and silicon content.
High V Grades	Vanadium....50-55% 60-65% 70-80% Silicon.....Low Carbon.....Low	For special applications and uses requiring large vanadium additions.
VANADIUM PENTOXIDE Technical Grade Fused Form	V_2O_5.....90%	A source of vanadium in basic electric furnace steels. A base for numerous chemical compounds.
Technical Grade Air Dried Form	V_2O_5.....83-85%	A base for preparation of numerous chemical compounds (catalysts, etc.).
GRAINAL ALLOYS Vanadium Grainal No. 1	Vanadium....25.00% Aluminum....10.00% Titanium.....15.00% Boron.....0.20%	Practical and economical intensifiers for controlling and increasing the capacity of steels to harden, and for improving other important engineering and physical properties.
Vanadium Grainal No. 6	Vanadium....13.00% Aluminum....12.00% Titanium.....20.00% Boron.....0.20%	See above.
Grainal No. 79	Aluminum....13.00% Titanium.....20.00% Zirconium.....4.00% Manganese....8.00% Boron.....0.50% Silicon.....5.00%	See above.
GRAPHIDOX No. 4	Silicon.....42-46% Titanium.....9-11% Calcium.....5-7%	For graphitization of iron; ladle treatment insures normal graphite, free from dendritic structure; reduces chill; efficient inoculant in production of high strength irons.
V-FOUNDRY ALLOYS V-5 Grade	Chromium....38-42% Silicon.....17-19% Manganese....8-11%	Used in cast irons as a ladle addition. Reduces chill, promotes uniformity of structure, increases strength and hardness.
V-7 Grade	Chromium....28-32% Silicon.....15-21% Manganese...14-16%	See above.
BRIQUETTES Ferro Chromium	Hexagonal. Weigh approx. 3¾ lb. and contain 2 lb. of chromium.	A practical and convenient form for adding ferro-alloys to the cupola.
Ferro Silicon	Two sizes, both cylindrical, one containing 1 lb. of silicon; the other, 2 lb. of silicon.	See above.
MISCELLANEOUS	Special ferro-alloys, metals, chemicals and carbides.	To meet individual requirements.

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Testing

Motor Brushholder Springs

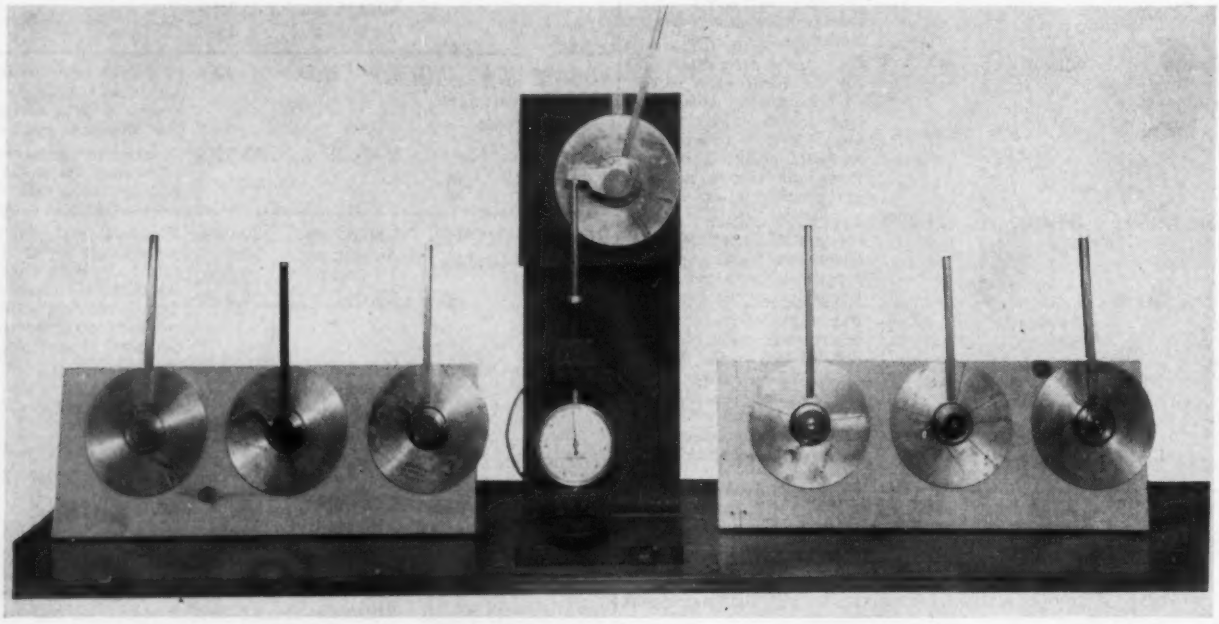
MODERN motors require constant brush pressure to maintain full efficiency—meaning that the brushholder spring must exert the same pressure on both new and worn brushes. These springs are wound in clock spring form and maintain pressure on the lever arm from the setting of the center arbor, according to Stephen Boddy of the General Electric Co. Works Laboratory, Erie, Pa.

In order to provide a method of testing which would duplicate the load and angular deflection of the spring as used in the brushholder assembly, the illustrated device was developed which is adaptable to various sizes of springs, and easily assembled.

Consisting of a spring ring with an extension rod, the load measuring device is calibrated in pounds. The lever arm rests on the extension rod and the spring ring substitutes for the brush in an actual assembly. A circular brass plate with a removable hub is marked with the zero and the angular positions of the spring. The hub is notched for the stationary end or center of the spring. Lever arm is attached to the plate to facilitate rotation of the spring, and a steel fabricated base or support holds the test plate in position relative to the spring ring. Special test plate is required for each type of spring, but is used with the same support and spring ring.

In operation, the proper test plate is selected for the spring to be tested, and mounted on the base. After proper adjustments are made in the first spring, further tests are made by replacing original sample with additional samples. The test plate is moved by means of the lever arm to the indicated position or positions and the load read on the dial of the spring ring.

Since adopting this test procedure, several previous questions on spring quality have been settled, and variations in various lots of springs have been considerably reduced, it is reported.



Phases of Black Light Inspection Discussed

More than 200 attended a 2-day conference on "Production Inspection with Magnaflux and Zyglo" at Rackham Memorial building, Detroit, Nov. 10 and 11.

At the meeting, sponsored by Magnaflux Corp., Chicago, various phases of inspection by magnetic powder and black light methods were described by a number of speakers. These included L. A. Danse, General Motors Corp., Detroit; Clifford Moody, Ford Motor Co., Dearborn, Mich.; R. L. Jackman, Chrysler Corp., Highland Park, Mich.; Clyde L. Frear, Bureau of Ships, Washington; J. Manuele, Westinghouse Electric Corp., East Pittsburgh, Pa.; John W. Jippenlatz, Lebanon Steel Foundry, Lebanon, Pa.; J. E. LaBelle, Detroit Diesel Engine Division, Detroit; C. F. Cook, National Twist Drill & Tool Co., Rochester, Mich.; C. E. Petz and W. E. Thomas, both of Magnaflux Corp.

German Abrasive Industry Found To Be Behind U.S.

Fabrication of finished abrasives in Germany has developed little if at all beyond the state of the American industry 15 to 20 years ago, according to a report published by Office of Technical Services, Department of Commerce, Washington, D. C. It has however, improved the quality and increased production of abrasive grain. Aluminum oxide and silicon carbide are the standard materials used for manufacturing grinding wheels, honing stones, segments and other solid abrasives, and also for coated abrasives, the report stated.

The war increased the demand for fine sizes of abrasive grain requiring the installation of additional equipment in various German plants and the adoption of water separation systems commonly used in the American abrasives industry. The report, bearing number PB-80333, goes on to say that although American abrasives are superior to German, the high cost of labor in this country will make it difficult to compete with the German product in the world market.

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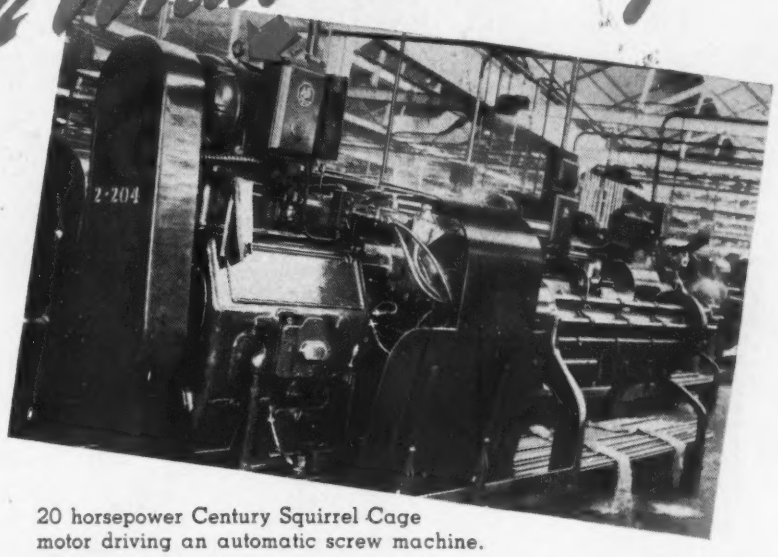


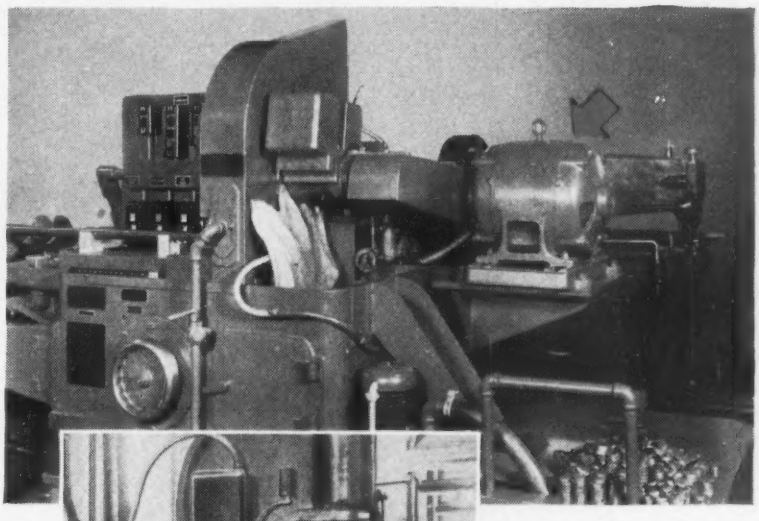
20 horsepower Century Squirrel Cage motor driving an automatic screw machine.

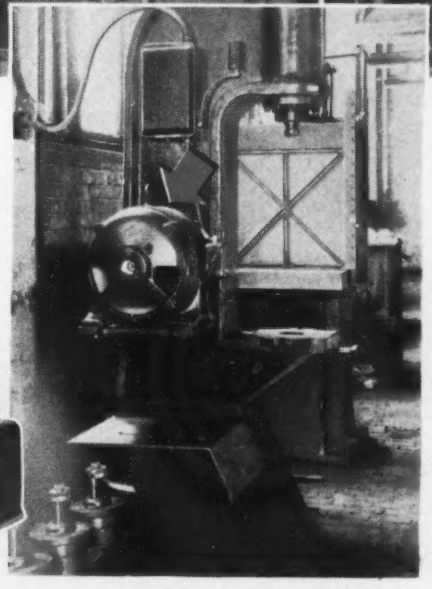
From the precision high speed production of an automatic screw machine to the rugged power of a large press, there's a Century motor with the stamina to stay on the job.

Throughout their wide range of types and sizes Century motors are ruggedly built. Rigid frames, accurately machined feet, large shafts, accurate alignments, adequate ventilation system and good mechanical and electrical balance — all contribute to their outstanding performance.

Century builds a complete line of fractional and integral horsepower electric motors, polyphase, single phase and direct current, in the popular sizes to meet the requirements of industrial production, processing, commercial and appliance needs.

Specify Century motors for all your electric power requirements.





10 horsepower Century Squirrel Cage motor driving an abrasive cut-off machine.

7½ horsepower Century Squirrel Cage motor driving a pump on a hydraulic press.

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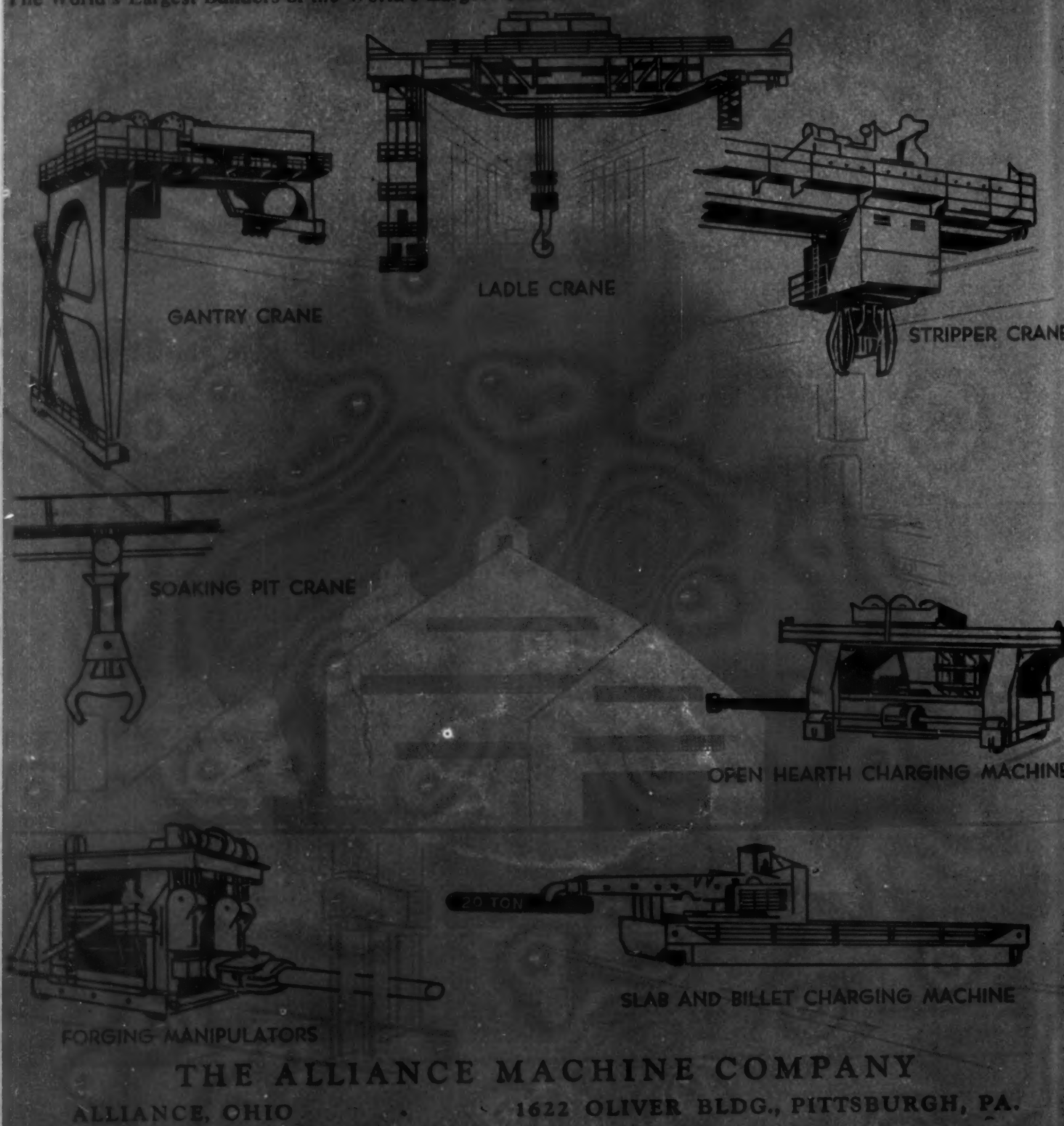

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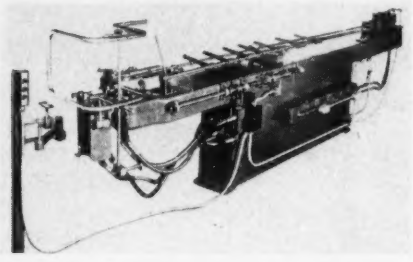
New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 150

1. Bending Machine

Up to an average of 800 bends per hour of an entire run is possible with pipe, bar, tube and extruded shape bending machines made by Pines Engineering Co., 601 Walnut St., Aurora, Ill. Machines have finger-tip control and built-in adjustments which permit single duplication of a

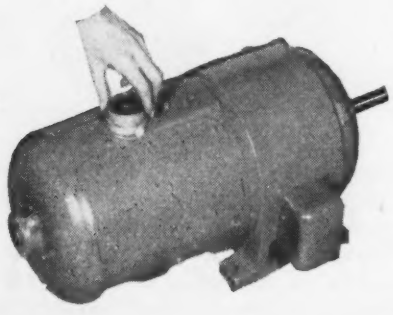


series of various bends on each piece throughout an entire lot. Pressing a button actuates all of the machine's operations in sequence.

Adjustable hydraulic clamps and variable speed control are set to suit size and composition of work. The roller type pressure die feeds with, and provides a back support for, the work. Thus, roundness is held and scratching of stock is eliminated. Various mandrels may be used to prevent wrinkling or deformation of the wall on small radius bends. Machines are made in sizes which will handle up to 6 inch extra heavy pipe.

2. Induction Motors

Tri-Clad brush shifting induction motors featuring a stepless speed adjustment over a 3:1 ratio by turning a dial are being manufactured by General Electric Co., Schenectady 5, N. Y., in ratings from 3 to 50 horsepower (220, 440 and 550 volts). The entire unit, except starter control, is enclosed in one housing. Remote



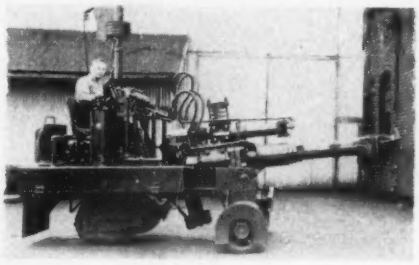
speed control may be accomplished by a flexible cable shaft up to 10 feet away from the motor. For complete remote control, a small pilot motor may be used to drive the speed control mechanism.

Uniform cooling with low intake velocity is provided by double-end ventilation. Built into the motors are over-load protection and limit switches to insure proper starting. Standard frames have NEMA mounting dimensions. Formex wire stator windings are used for resistance to oil and heat aging.

Motors are rated on a constant torque basis. They will carry full load torque at rated current and frequency without exceeding a temperature rise of 40°C on high speed or 50°C on low speed. Power factor is high when motors are running at high speed.

3. Tongs and Box Charger

Production of a combination tongs and box charger in capacities ranging from 2000 to 20,000 pounds for charging melting furnaces with a variety of scrap is announced by Edgar E. Brosius Co. Inc., Sharpsburg, Pa. Because it can turn on its own wheel base, it is well suited for congested



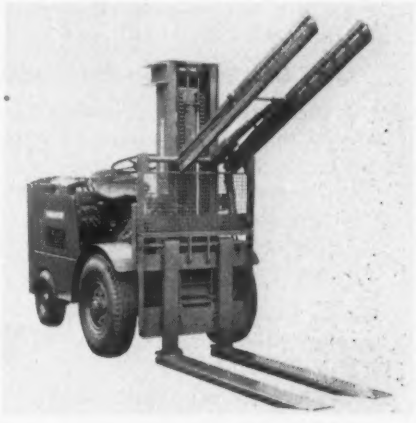
area operation. Tongs head of the machine is equipped with an engaging head so that a box may be used in charging loose scrap. Tongs are used when charging baled scrap.

Machine, which can charge from a number of angles, is powered by two electric motors—one supplying propelling power and the other driving an oil pump which actuates the hydraulic cylinder powering the rotation and tilting of the peel, steering and operation of tongs. Power is received from plant supply through a flexible cable and rotating collector mounted on the machine. A gasoline of diesel generator may be mounted on the machine for complete freedom of travel throughout the plant.

Modifications of machine are one for charging open top electric melting furnaces, one equipped for furnace leveling and another designed to unload baled copper scrap from mill trucks and deliver them to the furnace.

4. Lift Truck Clamp Arm

Shifting or slipping of large, flat loads while being transported or stacked is prevented by a clamp arm accessory for fork lift trucks, developed by Towmotor Corp., 1226 East 152nd St., Cleveland 10, O. It consists of a set of clamp arms which are hydraulically operated to grip the



load. Action is controlled by a valve adjacent to the operator.

Both arms are equipped with a layer of sponge rubber along the bottom edge, assuring a firm grip without marring or otherwise damaging the materials being handled. Accessory is also available with curved arms for cylindrical loads.

5. Multiple Drill Heads

Adjustable, multiple drill heads for use in larger drill presses and for heavier work are being manufactured in a medium duty line with two to six spindles by Wisconsin Drill Head Co., Milwaukee 3, Wis., and distributed by Sturtz & Meal Inc., Milwaukee 2, Wis. Known as Kwick-Change, the heads will drill holes up to 23/32-inch in cast iron. No. 2 Morse taper spindles with vertical adjustment are standard equipment.

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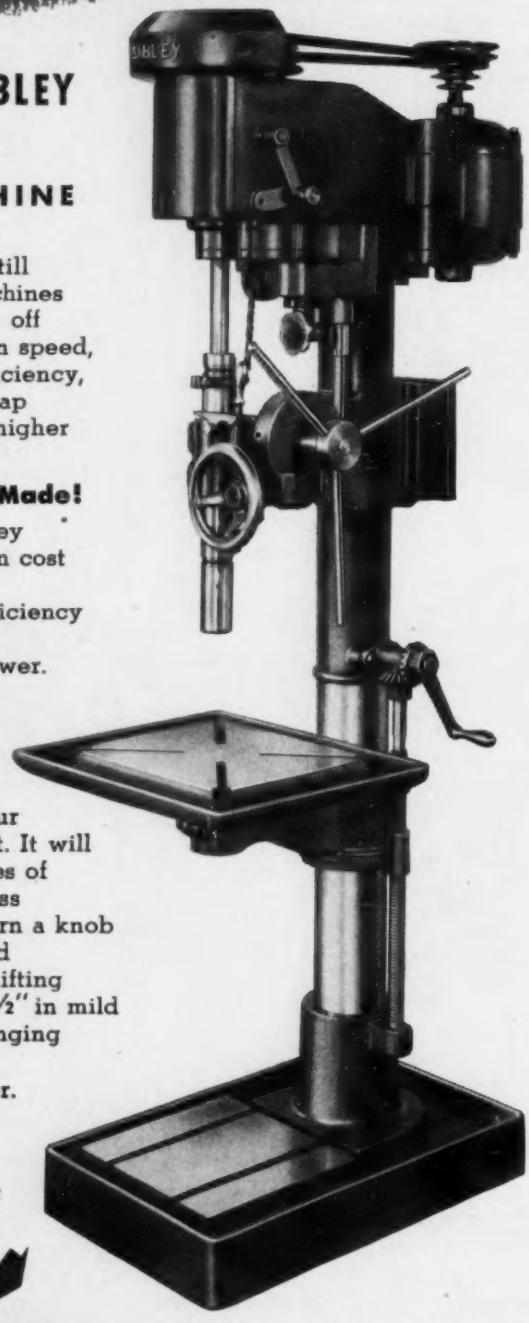
Install a new model C-20 in your plant and make a Time and Motion Study comparison with your present drilling equipment. It will demonstrate the advantages of such features as easy access to controls—where you turn a knob to select the proper geared power feed; convenient shifting of V-belt; power to drill 1½" in mild steel; 8 spindle speeds ranging from 65 to 1360 R.P.M. powered by a 2 H.P. motor.



GET COMPLETE INFORMATION ON THE SIBLEY MODEL C-20

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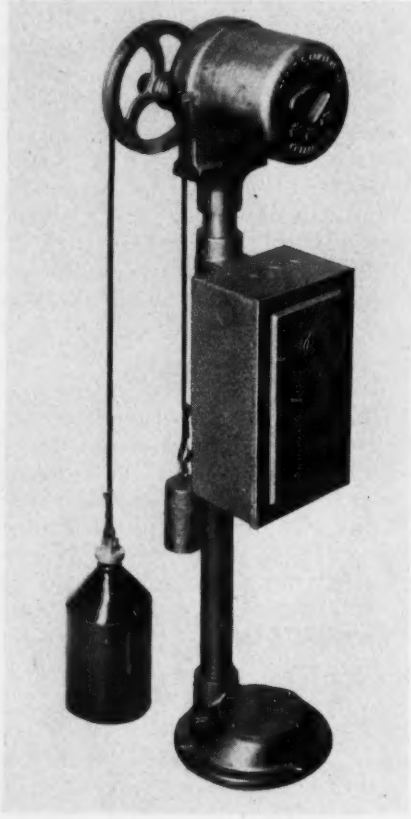
It has a gear ratio of 1 to 1 so that a lead screw may be used in tapping operations.

Minimum center-to-center location is 1⅝-inches. Diameters of bolt circles vary from 1-29/32 (minimum) to 14-43/64-inches (maximum). Overall height of head, without adaptors, is 13¼-inches. It is gear driven, each drill revolving completely around two different centers, both having a 1.333-inch radius. Each drill may be located anywhere within a 5.332-inch circle and all circles overlap. Positioning and locking templates are provided for each setup.

6. Float Controls

Equalizing the wear of two pumps, one of which is always used as standby equipment, is realized by the type HSB-2 Floatrol, made by Automatic Control Co., St. Paul 4, Minn. The unit transposes the starting sequence at the beginning of each pumping cycle. Type HSB-3 float control has the features of the first



mentioned plus an additional non-alternating circuit which may be used either for a third pump or as either a high or low alarm circuit. Third in the series is a type HSC-3 control which contains transfer plugs for manual transposing of circuits.

Level changes are transmitted to control by a ceramic float suspended by stainless steel tape from the

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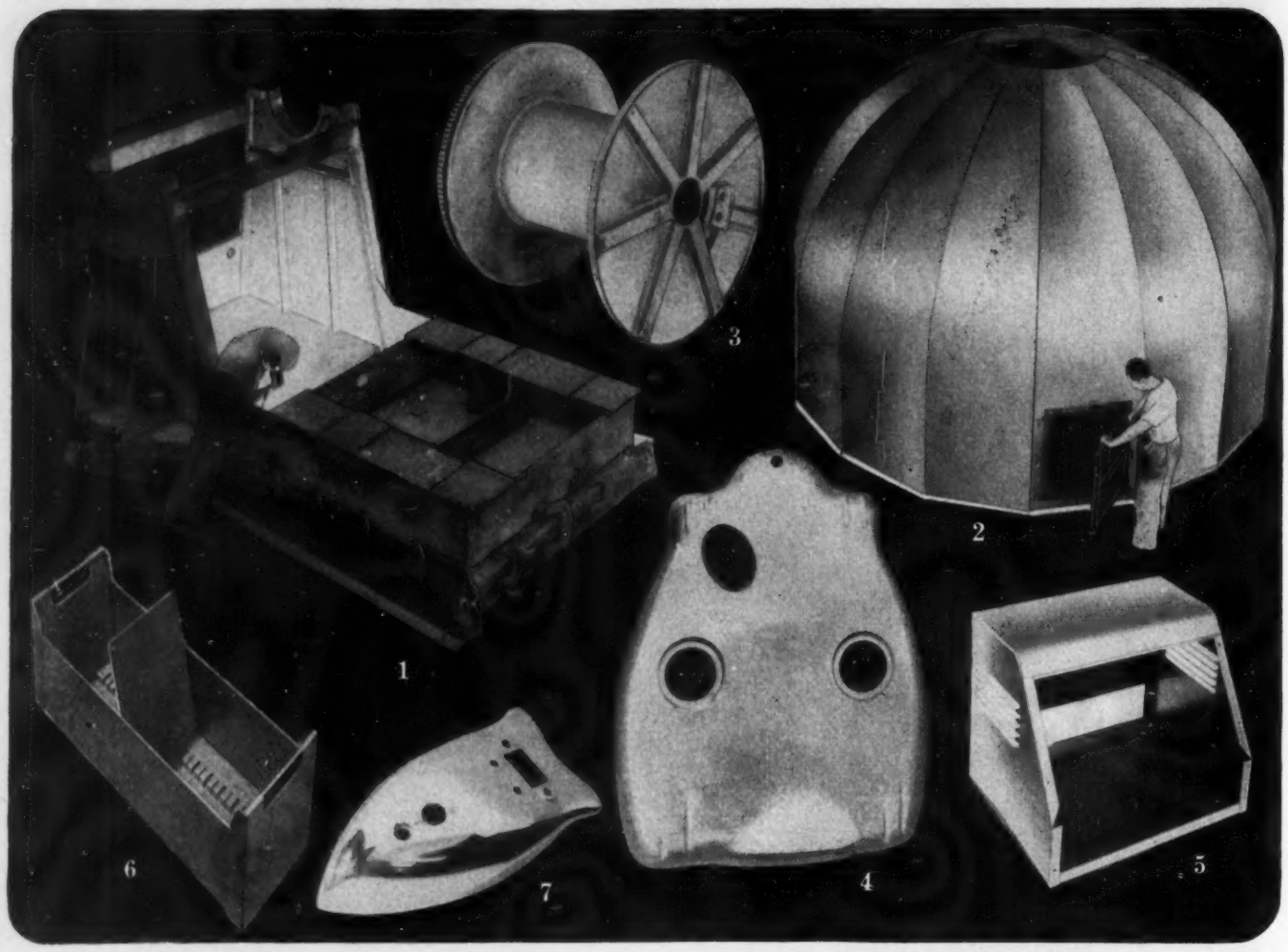

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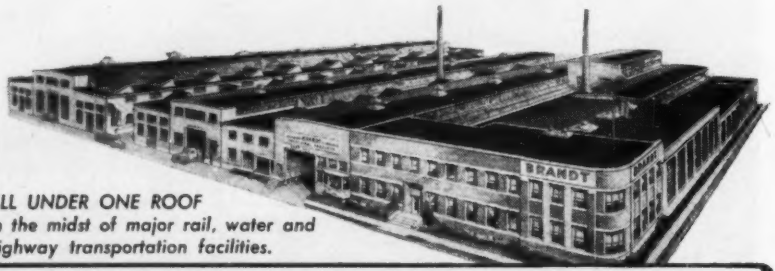

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sheave. Movement of float rotates the interior switching mechanism. Separate tripping cams for on and off permit each circuit to be adjusted to open and close at any desired point with total travel. If one pump fails to operate, standby pump will start at the level for which its mercury switch is set. Operation may be on 110, 220 or 440 volts, 60 cycles.

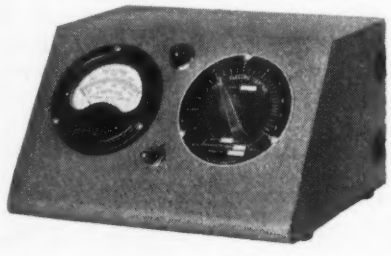
7. Dial Indicator

Quadrant type dial indicator which has standard mounting dimensions is announced by Standard Gage Co., Poughkeepsie, N. Y. Designated as Micronar, it has an extended field of accuracy and thus is suited for use on comparators and on fixtures for controlling especially close tolerances. It has a high amplification ratio.

Scale of the English unit model is divided into 0.0001-in. steps and in the central portion these intervals are subdivided into 0.00002-in. The effective range is 0.0018-in. Dial is rotatable over a small angle by means of an adjusting screw. Gage is furnished with a sapphire tipped contact point for wear resistance. In addition to English model, there is available a metric model graduated in 0.001 mm and having a range of 0.04 mm.

8. Temperature Controller

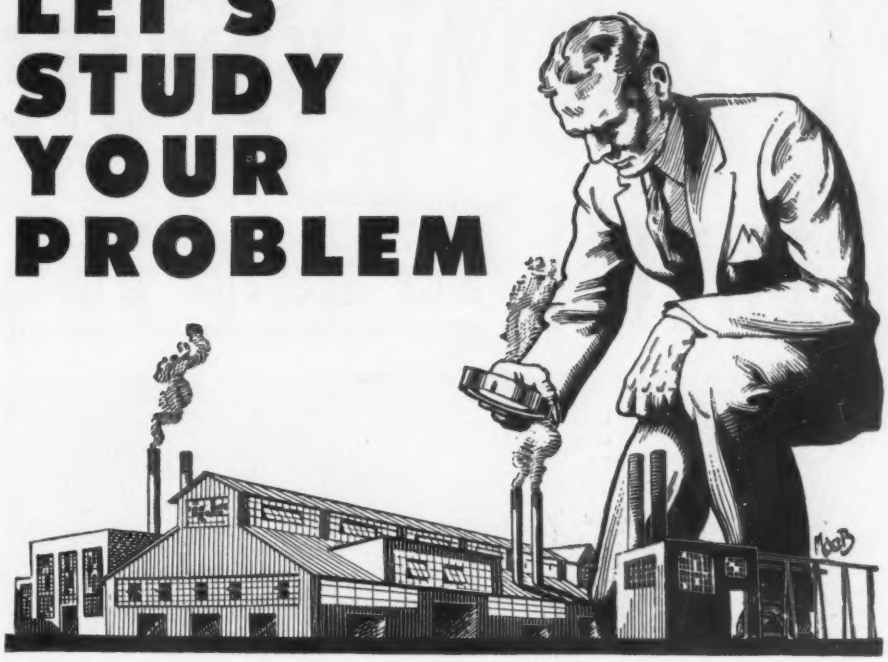
Developed by Thermo Electric Mfg. Co., Dubuque, Iowa, a stepless input controller and temperature indicator is available for use with various makes of electric furnaces, ovens, melting pots, heating tanks and other heating devices. Incorporated in it is a thermostatic switch controlled by a knob on the instrument panel. Control knob may be



set to regulate current input into heating equipment anywhere from 5 to 100 per cent of the "on" time.

Provision is made for automatic compensation of line voltage changes and maintenance of constant watt-hour input, resulting in even temperature. The instrument contains a pyrometer calibrated in both fahrenheit and centigrade scales to 2000°F and 1100°C. A 4-foot color-coded

LET'S STUDY YOUR PROBLEM



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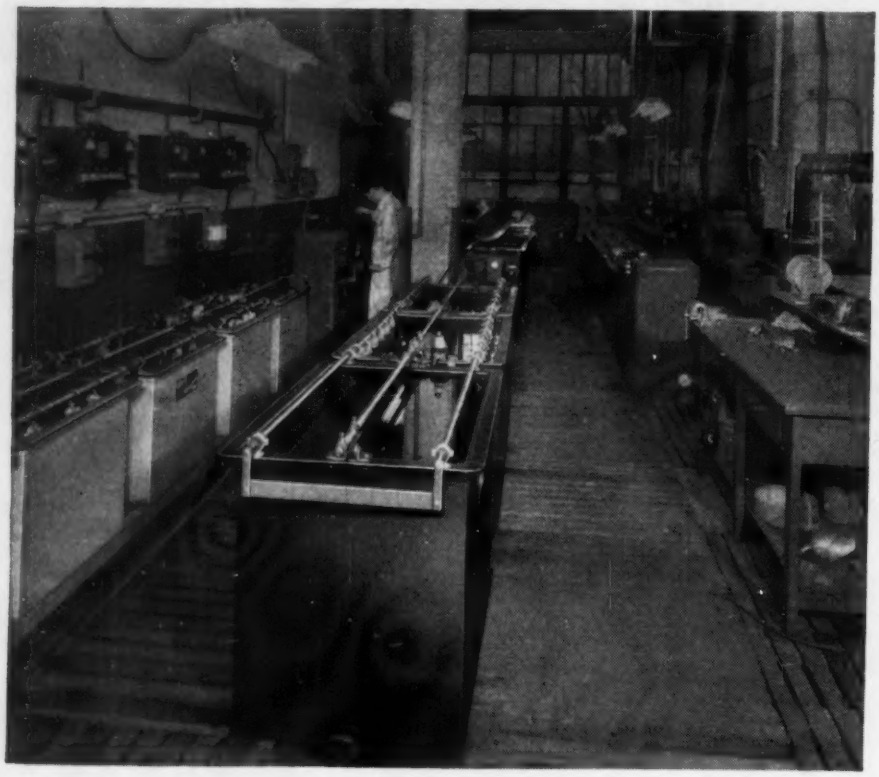

THE UDYLITE PILOT PLANT
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the link between the laboratory and the plating room. *Here your samples* are processed under actual plating room conditions. *Here your plating* problems are solved; new, more efficient cycles are worked out. *Here is determined* the practicability of the proposed equipment *before* the purchase—*before* the installation. *Here again Udylite* provides special service to every Udylite customer.

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thermocouple of 14-gage chromel-alumel is supplied with the unit. Eight models, covering current requirements of 115 and 230 volts, 10 to 35 amperes, 25 and 50/60 cycles alternating current, and for direct current, are available for use under varying conditions.

9. Gang Limit Switch

Operating on the rolling spring principle, a 12-gage open blade limit switch, manufactured by Acro Electric Co., 1323 Superior Ave., Cleveland 14, O., is a single unit, permanently fastened together with countersunk rivets for flush mounting. It is available with normally open, normally closed or double throw circuit on any pole or combination of poles. Operation may be by either cam or plunger.

Center blade and rolling spring are of heat treated beryllium copper. All other parts are cadmium plated. Dimensions are 5⅞ x 2 1/16 x ½-inches. Switch is rated at 10 amperes, 125 volts, alternating current. Operating force required is 4½ to 6 ounces. Maximum movement differential is 1/16-inch and minimum over travel is 1/16-inch. Minimum release force of the switch is 2½-ounces.

10. Grooved Die Sets

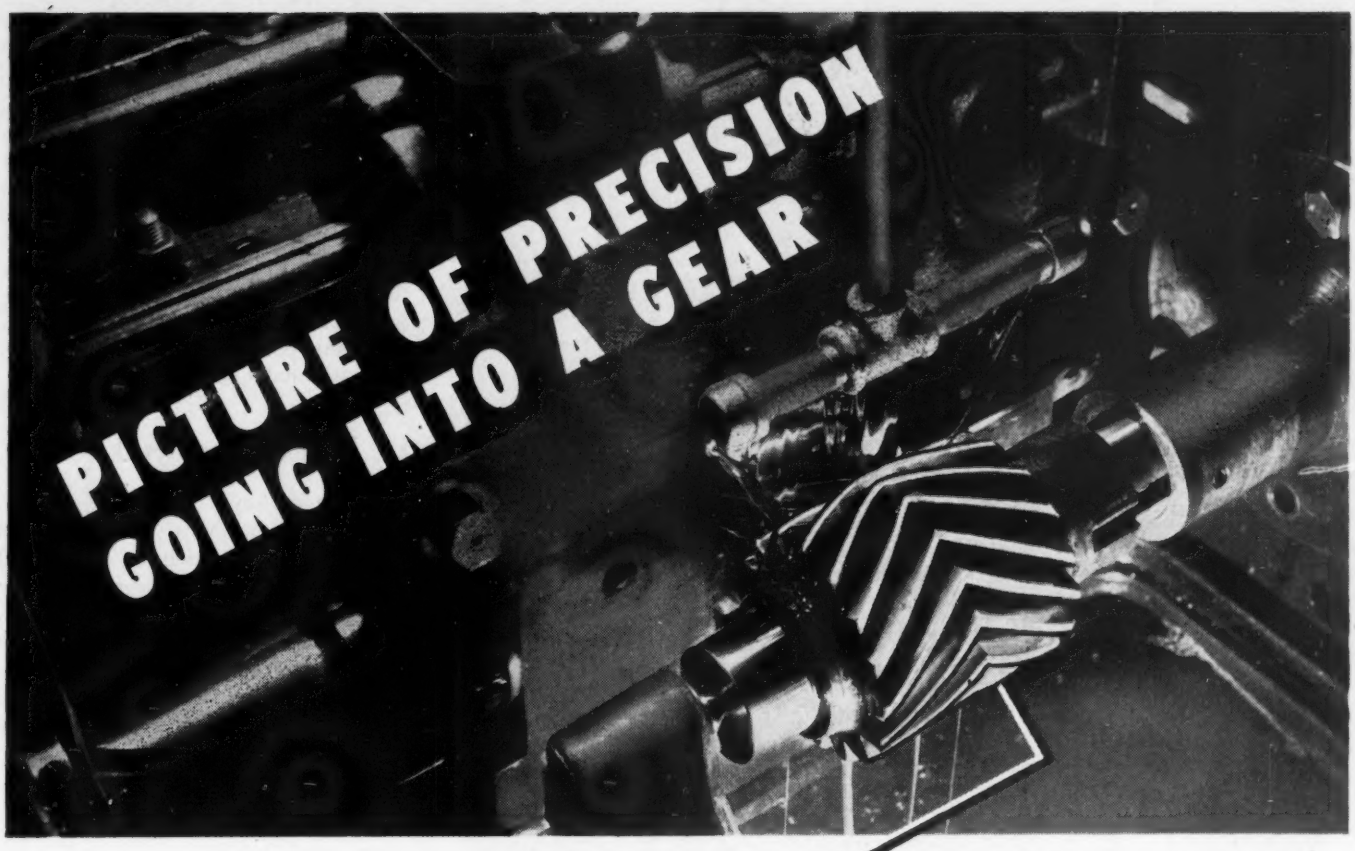
E-Z Lift safety flanges, standard on all die sets made by Superior Steel Products Corp., 2754 South 19th St., Milwaukee, Wis., have the bottom grooved for ease in handling. On small sets that can be lifted by hand. the operator inserts his fingers in the grooves instead of sliding the set to the edge of the bed and tilting it. The danger of smashed fingers both in picking up and putting down sets is eliminated.

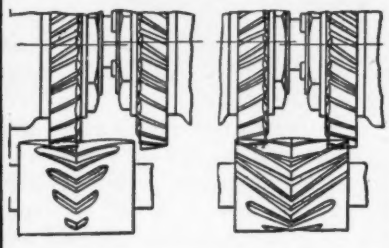
With larger sets, lifting hooks lock into the grooves of the safety flange, a time saving method that prevents the die sets from sliding during lifting.

11. Instrument Pickup

Indication of practically any type of industrial or aircraft instrument is automatically sensed with the no torque instrument pickup announced by Fairchild Camera & Instrument Corp., 88-06 Van Wyck Blvd., Jamaica 1, N. Y. It does not affect instrument accuracy because it has no torque requirements.

Pickup reads the position of an instrument pointer, then converts this same position into an electrical phase angle. Accuracy of indication is with-





The cutters of Farrel-Sykes machines reciprocate, one cutting when movement is in one direction and the other when the movement is reversed. Each ends its stroke at the center of the blank. As they cut they twist to generate the helices and also slowly revolve in unison with the gear blank to generate the tooth contours precisely.

The Farrel-Sykes method of precision generation gives Farrel continuous tooth herringbone gears extreme accuracy of tooth spacing, contour, and helix angle.

In operation, this tooth-to-tooth accuracy pays off in smooth, quiet, uniform power flow. Backlash is reduced to a minimum and the load is distributed evenly across the entire face width.

Known throughout industry as the *Gear with a Backbone,* these gears, provide extra strength and load-carrying capacity, and long, trouble-free service life.

They are available in any size up to 20 feet in diameter, for practically any application. Information and engineering assistance available, without obligation.

FARREL-BIRMINGHAM COMPANY, INC.
344 VULCAN ST., BUFFALO 7, N. Y.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Chicago, Los Angeles, Tulsa, Houston

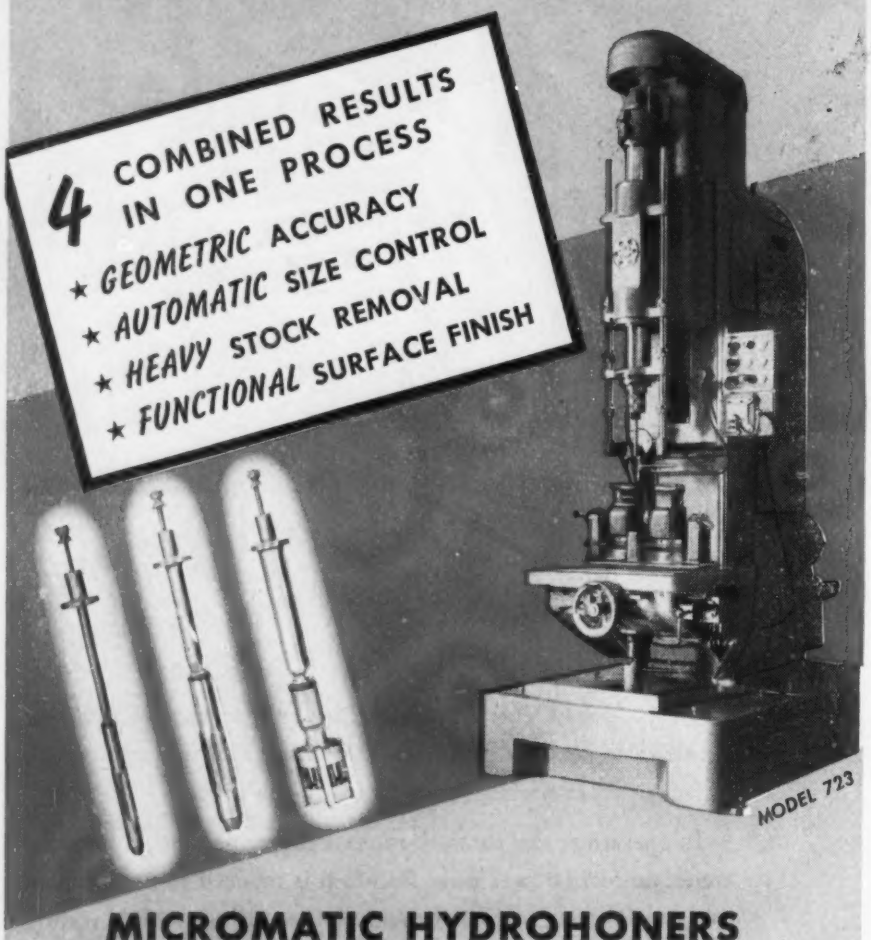
FB-394

FARREL
The Gear with a Backbone

Farrel-Birmingham

MODERN
MICROHONING is
AUTOMATIC
PROCESSING CONTROL

4 COMBINED RESULTS IN ONE PROCESS
★ GEOMETRIC ACCURACY
★ AUTOMATIC SIZE CONTROL
★ HEAVY STOCK REMOVAL
★ FUNCTIONAL SURFACE FINISH



MICROMATIC HYDROHONERS
equipped with Microhoning Tools

in many different installations have cut total processing by one or two operations—have reduced the over-all amount of waste stock removal—have generated uniform final size AUTOMATICALLY within 0.0001 to 0.0003-inch—eliminated selective fits in some parts—reduced inspections to one or two spot checks per shift.

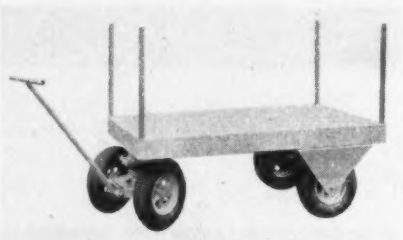
The highlights of Modern Microhoning are available in sets of several booklets. Don't you want a set?

MICROMATIC HONE CORPORATION
8100 SCHOOLCRAFT AVE. • DETROIT 4, MICHIGAN
Los Angeles, Calif. • Houston, Texas • Rockford, Ill. • Guilford, Conn. • Brantford, Ont., Can.

in a few degrees, depending upon associated equipment. There is no mechanical connection between pickup and instrument and there are no moving parts in the pickup. The covering glass window on the instrument is replaced by the pickup and a small permanent magnet is mounted on the indicator shaft whose position is to be read. Indication is obtained by the phase of magnetic couple between the stationary magnetic field of instrument pointer and rotating field of instrument pickup.

12. Wagon Type Truck

Designed for operation both indoors and outdoors, a new 2500 pound capacity, pneumatic wheeled truck of the wagon type, built by Market Forge Co., 25 Garvey St., Everett, Mass., may be furnished for hauling by tractor, truck or automobile. Platform measures 30 x 60 inches and is 22 inches above the



floor. It has four 16-inch diameter pneumatic wheels with tubes, mounted on roller bearings.

Constructed entirely of steel, it has a pulling handle equipped with a balancing arrangement which holds the handle off the floor at all times. Steering arrangement consists of a double row ball bearing fifth wheel. Truck may be equipped with stakes, push handles, reversible shelves, box units, and other units for handling various materials, all made by the company.

13. Indicating Instruments

Two new series of precision electrical indicators bearing the name Ver-Tell are offered by the Taco West Corp., 2620 South Park Ave., Chicago 16, Ill. A model I millivoltmeter pyrometric indicator which is thermally compensated includes a thermostatic automatic cold junction correction. Model H millivoltmeter pyrometric indicator replaces the conventional cold junction compensation with the more sensitive Hypar compensator which derives its operative energy from a line supply.

Construction of these electronic instruments incorporates a precision

ROUND THE CLOCK POWER

for Industrial Trucks

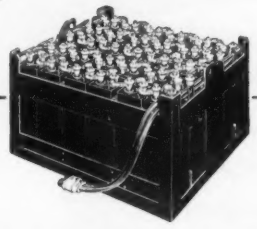
In hundreds of industries where production schedules require it, battery industrial trucks are working 24 hours a day, day after day, with a regularity that many people thought was impossible until they saw it demonstrated.

Here are some of the reasons: A battery industrial truck employs electric-motor drives which are inherently simple; have few moving parts to require repair. The truck is kept continuously supplied with power by batteries that are exchanged at convenient intervals, usually 8 to 12 hours. Charging and any other service needed by the batteries is performed while they are out of the truck.

It is economical . . .

A battery industrial truck is also economical. Its batteries are charged from low-cost electric power and they apply the power to the job with high efficiency: instant starting; rapid acceleration; no power consumption during stops. These are exactly the power characteristics needed by stop-and-go handling work.

Thus a battery industrial truck is an inherently dependable and economical machine. It is extra dependable and extra economical when powered by EDISON Nickel-Iron-Alkaline Batteries, the batteries that have steel cell construction, a solution that is a natural preservative of steel, and a fool-proof electrochemical principle of operation. The Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. Offices in principal cities. In Canada, International Equipment Company, Limited, Montreal and Toronto.



In Industrial Trucks,* EDISON *Nickel-Iron-Alkaline Batteries Give You These Important Advantages

They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.

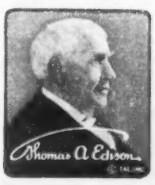
They can be **charged rapidly;** gassing cannot dislodge the active materials.

They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.

They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents.

They can **stand idle indefinitely** without injury. Merely discharge, shortcircuit, and store in a clean, dry place.

They are **simple and easy to maintain.**

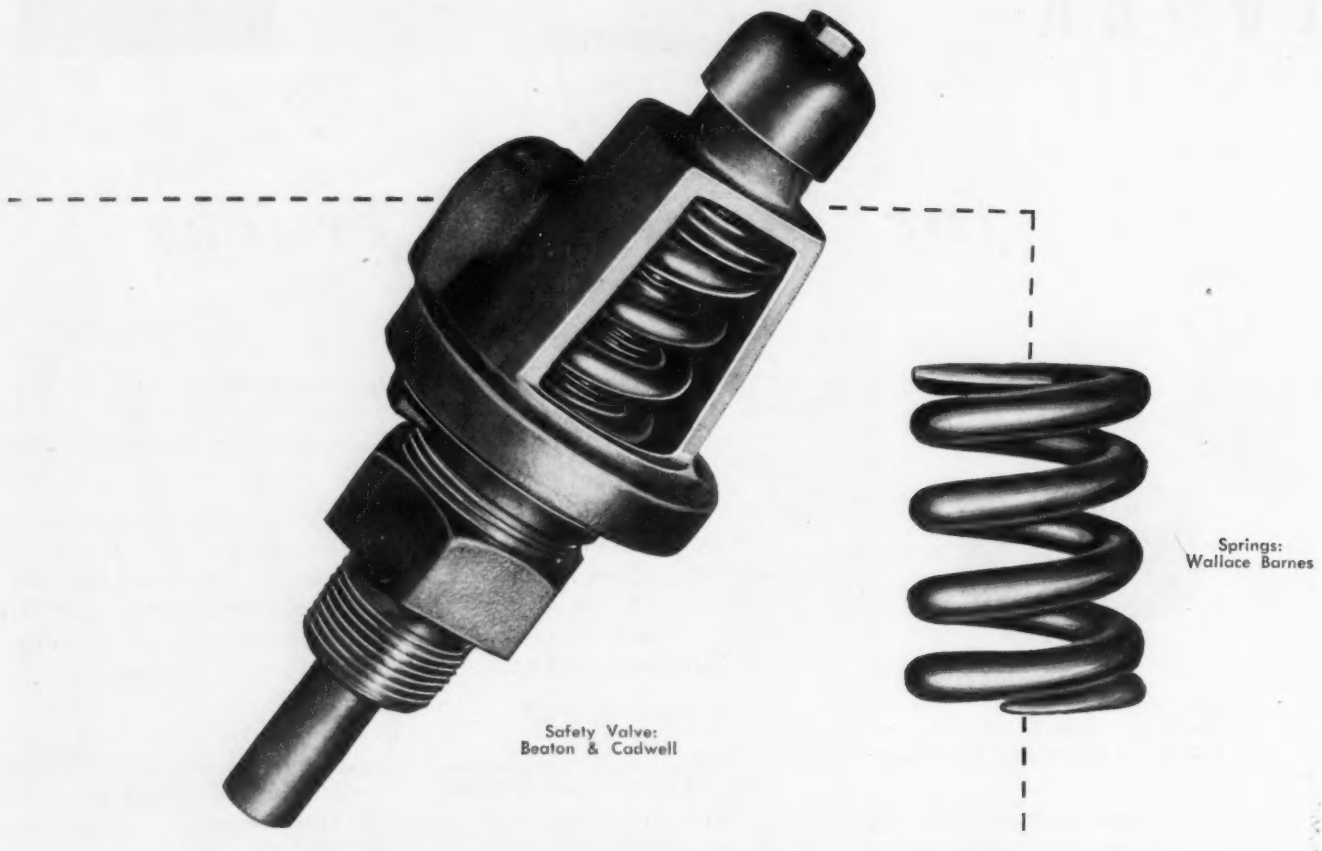


EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES

For a high Safety factor . . .
the Springs are of **SEYMOUR PHOSPHOR BRONZE**



Springs:
Wallace Barnes

Safety Valve:
Beaton & Cadwell

With the pressure on and temperature mounting in a modern hot water storage tank, everything depends on the reliability of the safety valve. Because positive and dependable operation is vital, Seymour Phosphor Bronze is a natural choice for the springs used in this assembly. Seymour Phosphor Bronze will undergo long-continued flexures and tension without loss of efficiency. Highly corrosion resistant, of excellent spring qualities, Seymour Phosphor Bronze is the ideal alloy where a high safety factor is imperative.

Seymour Phosphor Bronze is available in Sheet, Wire, and Rod. Write for catalog containing specifications.

THE SEYMOUR MANUFACTURING COMPANY, SEYMOUR, CONNECTICUT

SEYMOUR

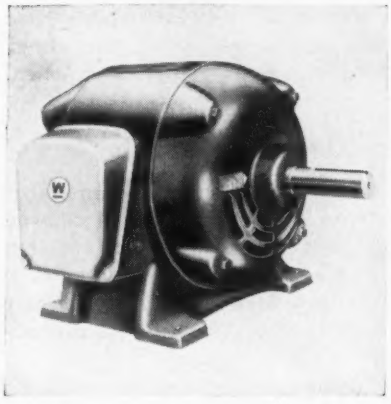
NONFERROUS ALLOYS SINCE 1868

instrument assembly method in which parts are rigidly aligned and permanently fastened by the Kool-Weld process. This insures a vibration proof structure, creep proof calibrations and production uniformity. Instruments have a 5-inch scale, anti-parallax mirror and targeted knife edge pointer.

14. All Steel Motor

All-steel construction of frame, feet and end brackets is a feature of the single phase Life-Line Farmotor, manufactured in sizes of 1, 1½, 2, 3, 5 and 7½ horsepower by Westinghouse Electric Corp., Pittsburgh 30, Pa. Motors are of capacitor-start, induction-run type, with self-contained capacitor and transfer switch, which disconnects capacitor as motor reaches full speed.

Air openings are in the lower half in the end-bells, this location giving



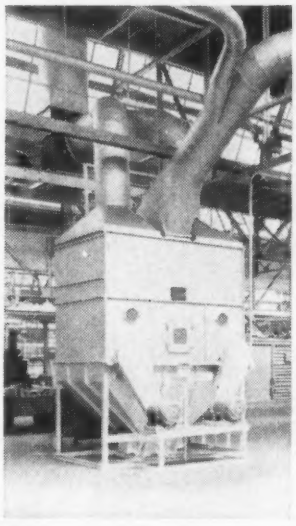
protection against dripping liquids. Sealed prelubricated ball bearings give effective lubrications for 5 years or longer without repacking. One, 1½ and 2 horsepower motors have built-in manual reset thermostatic protection against excessive internal temperatures resulting from overloads, too frequent starting, stoppage of ventilation, etc. Motors are available for 60 cycle, single phase 220 volt service. Operating speed is 1740 revolutions per minute.

15. Locomotive Crane

Electric power is used to travel along the rails while diesel power operates the turntable and load lifting mechanism of the new Dieselectric locomotive crane manufactured by American Hoist & Derrick Co., St. Paul, Minn. Crane may be used with grab bucket, grapple, magnet and for car switching, in addition to its regular hook work functions throughout plant or yard.

Crane features use of electric power from the traction generator

Completely CLEARS YOUR PLANT OF DANGEROUS DUST AND FUMES



CENTRI-MERGE Collection Units are available in capacities to handle any air cleaning job—small or large. May be installed singly or in batteries, depending upon volume of air to be handled.

Safeguard of employees' health—*Security* against fire—explosion—abrasion and corrosion of machines and manufactured products. That's CENTRI-MERGE in action—in foundries—machine shops—chemical laboratories—plastic plants—and the many other industries where dust and fumes are a menace to workmen and work. AUTOMATICALLY—by suction—contaminated air is cleared from working areas—carried on a powerful air stream through a descending curtain of water into the CENTRI-MERGE Collection Unit, where all foreign matter literally is scrubbed and pounded out in a seething tornado of water. Air goes out the exhaust. Dust and dirt are flooded into a sludge tank beneath the Unit—*under water*—out of circulation for good.

THE *best* AIR PURGE *is* CENTRI MERGE

Consult Schmieg engineers regarding your problems of dust and fume control.

Schmieg INDUSTRIES INC.
Engineers & Manufacturers

298 PIQUETTE AVENUE • DETROIT 2, MICHIGAN

CLARK

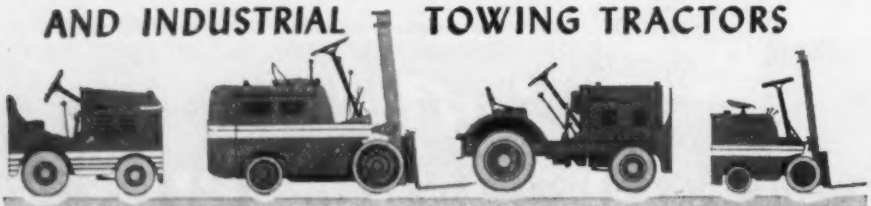
"CLARK TRUCTRACTOR *Stole the Show!*"

That was the consensus of visitors to the First National Materials Handling Exposition.

You can count on Clark Tructractor to "steal the show" again at the second Exposition in Cleveland, January 12 through 16, 1948, with a display of sound and practical new handling ideas! Fork-Lift Trucks, Towing Tractors and attachments — products incorporating Clark's traditional quality and unrivaled experience.

If movement of materials enters into any phase of your operations, a visit to Clark's exhibit is a MUST. Booths—407-8-9 and 419-20-21.

CLARK GAS OR ELECTRIC POWERED FORK TRUCKS AND INDUSTRIAL TOWING TRACTORS



CLARK EQUIPMENT COMPANY, TRUCTRACTOR DIVISION, BATTLE CREEK, MICHIGAN
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

for energizing the magnet, with overexcitation for maximum loading. Electrified rail drive is smooth in starting, serving to eliminate much of the maintenance coming from uneven starting. Capacity of crane is 40 tons.

16. Welding Valve

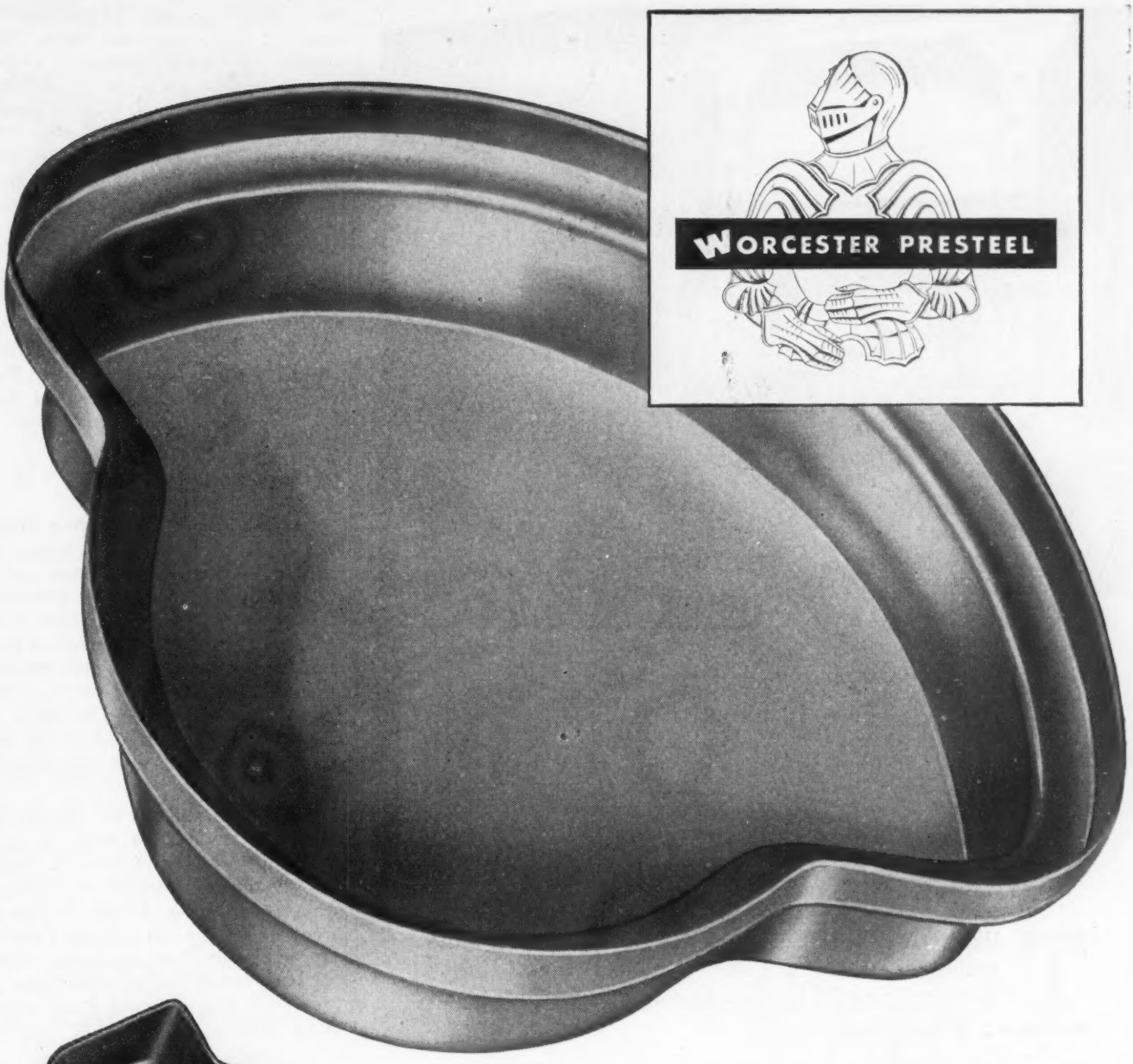
Designed to cut down argon consumption in production Heliarc welding, a new shutoff valve is announced by Linde Air Products Co., 30 East 42nd St., New York 17, N. Y. This V-30 valve controls both argon and water supply and is operated by an extension lever on which the torch is hung when not in use, as argon is required only when welding is actually in process.

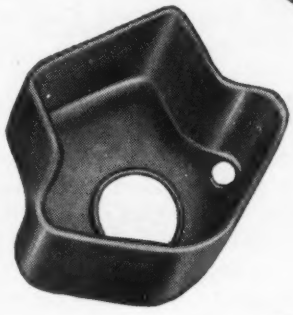
Valve has a self sealing type of packing that will operate for long periods without maintenance or leakage. It is designed for operating pressures up to 100 psi for both argon and water. An adjustable base that makes it easily set for either wall or bench mounting is supplied.

17. External Comparator

Setting of the external comparator No. 951, made by Brown & Sharpe Mfg. Co., Providence 1, R. I., requires but one master. It has a range of 0 to 4 inches and measures by 0.0001 to 0.00001-inch. The anvil is reversible and, in addition to its regular surface, provides a narrow surface for small parts. It has adjustable measuring pressure and is self-checking.

An internal comparator attachment No. 952 is offered for use with





Instrument Cases . . . Close Tolerances . . . Presteel Has the Experience

As producers of precision stampings we have made many large, small and medium-size instrument cases to exacting tolerances—effecting substantial economies for our customers. Illustrated are two of them.

Added advantages of Presteel Instrument Cases are . . . lighter weight . . . greater strength . . . fewer finishing operations . . . improved appearance.

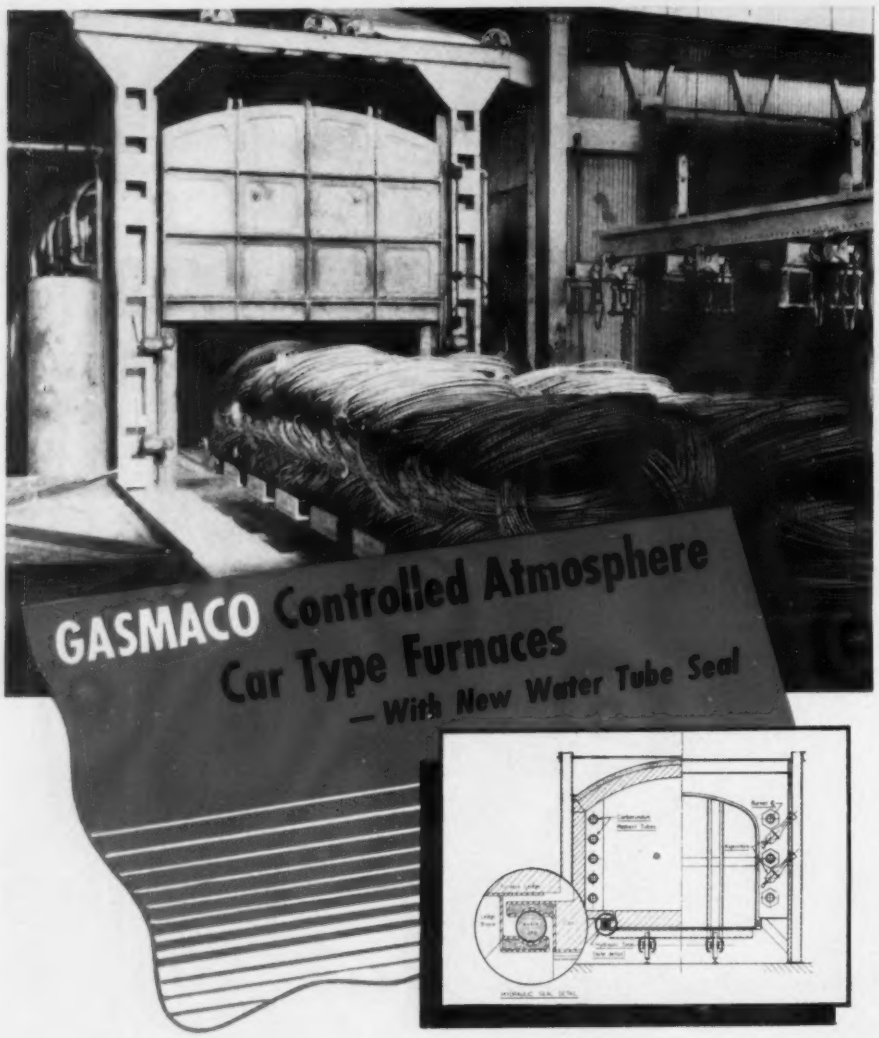
Do you consider these features important? — Visit us at Worcester or contact our representative nearest you.

WORCESTER PRESSED STEEL CO.

ALLOY STEELS AND OTHER METALS COLD FASHIONED SINCE 1883

512 BARBER AVENUE, WORCESTER 6, MASS.

Representatives in Alexandria Virginia, Buffalo, Canton Ohio, Chicago, Denver, Detroit, Fort Worth, Indianapolis, Los Angeles, New York, Philadelphia, Syracuse, Toronto

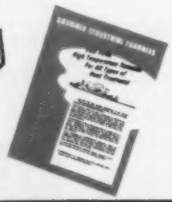


THESE Car Type Furnaces are equipped to handle material of almost any size, shape and height. They are ideally suited for heat treating, spheroidizing and annealing applications.

The water tube seal shown above (patent applied for) is a recent development which illustrates how GASMACO Engineers are constantly improving furnace efficiency. This seal eliminates the possibility of air leakage into the heating chamber around the furnace car—assuring uniform controlled heating within the chamber.

By calling in a GASMACO Engineer on your next heat treating job you will have the benefit of over 45 years' experience in furnace engineering—experience which means uniform, low cost, dependable furnace operation.

Write for Folder A-100 which shows the complete line and describes various furnace applications.



THE GAS MACHINERY Company

Designers and Fabricators of all Types of Industrial Heating and Handling Equipment.

16116 WATERLOO ROAD . CLEVELAND 10, OHIO

the comparator and is inserted in place of the removable anvil. By means of interchangeable plugs, measurements may be made by 0.0001 to 0.00001-inch over a range of ½ to 2 inches. Gage head cartridge No. 953, also for use on the comparator, is frictionless and dust and moistureproof. Its small, compact form lends it to application in a variety of installations for jigs, fixtures, gages, etc. It provides for measurements by 0.0001 to 0.00001-inch.

Used in conjunction with the comparator are electronic amplifier No. 950 and signal light attachment No. 958, both made by the company.

18. Gas Cylinder Valve

Security Valve Co., 410 San Fernando Rd., Los Angeles 31, Calif., is manufacturing a packless stem valve for oxygen and acetylene cylinders which will not freeze in either open or closed position. Another safety feature is that it is impossible to dissemble the valve by turning the spindle past the opening position. A brass retaining washer stops the upward motion of the new type valve's spindle.

Downward motion of spindle is halted by the valve's neoprene seat and a metal-to-metal contact. Valve gas pressure is utilized to increase seal effectiveness. It has a forged brass body and a full grip hand wheel. Operating pressures are 1 oz to 3500 psi. Operating temperatures are 70 to 250° F and open and close torque is 35 in-lb.

19. Thermometers, Gages

Recording thermometers and recording gages, known as series 500 recorders, are announced by Bristol Co., Waterbury 91, Conn. Incorporating improvements which make them easier to use, more convenient to service and convertible from one type to another, the instruments may be mounted either on a wall, front of panel or flush on a panel. The case features an inlaid sponge-rubber door gasket, flush roll-type door handle and nonprojecting door hinges.

Mounting block, which holds the external connections to the instrument, is removable. Pen arms are pivoted on stainless steel journals with pen arm shaft supported at both ends in a rigid one piece mounting. Link members between the measuring element and pen-arm mechanism are readily removable without tools and may be equipped with over-range and under-range two-way springs

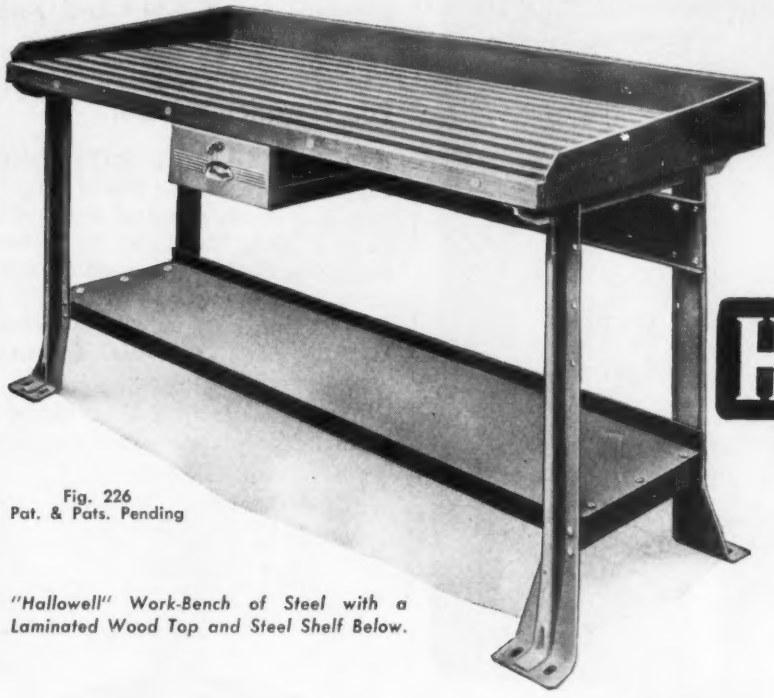


Fig. 226
Pat. & Pats. Pending

"Hallowell" Work-Bench of Steel with a Laminated Wood Top and Steel Shelf Below.

HALLOWELL

Fig. 732
Pat. & Pats. Pending
Drawer is extra

"Hallowell" All Steel Work-Bench. Includes Backboard, End Pieces and Full Shelf. Shipped Knocked Down.

HALLOWELL

STEEL WORK-BENCHES. . . WITH LAMINATED WOOD OR STEEL TOPS

These ready-made, exceptionally strong, fire-resistant "Hallowell" Work-Benches of Steel are designed to stand firm without costly bolting to the floor and to give you excellent service for years and years. They are made in a number of standard heights, widths and lengths, which, if desired, may be easily disassembled and moved. The "Hallowell" being standardized can be joined end-to-end to form a continuous work-bench of almost any length. As illustrated, bench tops are available with the finest, heavy laminated wood construction; or of tough, smooth steel. Steel tops may also be covered with Masonite. Several hundred combinations of "Hallowell" Work-Benches assure you of being able to select the right bench for your requirements. Write now for your copy of the "Hallowell" Catalog.

"Hallowell" Products are sold entirely through Industrial Distributors.

Over 44 Years in Business

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA., BOX 579 • BRANCHES: BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • SAN FRANCISCO

Ampco Metal announces a line of corrosion-resistant centrifugal pumps...

Fills a real need — this new line of pumps is ideal for all industries faced with the problem of transferring corrosive and erosive thin liquids. Ampco Metal, Inc. manufactures these corrosion-resistant pumps, heretofore considered as special, on a production basis — giving you production-built prices and deliveries.

Ampco Metal makes the difference. The pumps are of the heavy-duty industrial type. They are soundly designed for mechanical durability, high efficiency, and ease of servicing. The paramount feature, however, is the material used in their construction; namely, *all aluminum bronze* as produced in Ampco Metal's laboratory-controlled foundry. These time-proven aluminum bronzes make possible the pumping of such liquids as sulphuric acid, acetic acid, mine water, brines, oils, solvents, beer, food process liquors, etc. Not only are the pump parts in immediate contact with the liquid made of aluminum bronze, but supporting members subject to seepage and spray, such as pedestal, shaft, and sleeve, also are made of this corrosion-resistant material.

Guaranteed efficiencies. These single stage, single suction, corrosion-resistant pumps use totally enclosed impellers. All liquid passages are streamlined for maximum efficiency, quiet operation, and minimum wear. Smooth sloping characteristics have sharp break-off to limit maximum horsepower requirements. All sizes of pumps are available either as pedestal-type for coupling connection to any type of drive, or close-coupled to a face-type motor.

Write for latest bulletin.

AMPCO TRADE MARK

P-23

Ampco Metal, Inc.

Department S-12, • Milwaukee 4, Wisconsin

when required. Thermometers and gages are furnished in 8 and 12-inch sizes in a wide variety of ranges.

20. Vibration Control

Korfund Co. Inc., 48-37 Thirty-Second Place, Long Island City 1, N. Y., is manufacturing a vibration control unit, the type RS conical rubber spring mounting which has a load capacity ranging from 25 to 125 pounds per unit. The conical spring design provides horizontal stability.

Combined use of rubber and steel springs not only increases load capacity but also provides a wide frequency range for successful isolation. It is said to be effective for pumps operating at 1750 revolutions per minute and for compressors running at 450 revolutions per minute.

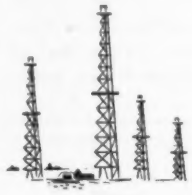
21. Tapping Unit

Govro-Nelson Co., 1931 Antoinette St., Detroit 8, Mich., is manufacturing a model KT tapping unit in which centrifugal pressure provides the feed that automatically handles any number of threads per inch. Its sensitive feed will tap 0-80 and 1/4-20 threads without adjustment. With accurate tap, proper alignment and adjustment, the unit will produce class 4 threads.

Design features three-point ball bearing suspension and free-rolling centrifugal weights. The entire mech-

behind tough drilling bits

INTERNATIONAL GRAPHITE ELECTRODES



Drilling oil wells through rock formations at high speed calls for rotary cone bits with high strength and maximum resistance to hard, abrasive wear. That's why they are made of tough, hard, high alloy steels.

Makers of electric furnace steels for rotary bits as well as for pulley blocks, draw works, and many other oil field accessories depend on International Graphite Electrodes as an essential factor to uniform quality steel. And they have found, in actual electric furnace operation under a wide range of production requirements, that International Electrodes have what it takes to make the steels that can "take it"—right physical, electrical and chemical properties in the right combination for their exacting needs. Write today for your vest pocket edition of the International Engineering Data Book.

3224

Specify INTERNATIONAL Graphite Electrodes for—Slow consumption—High current capacity—Low rate of oxidation—High thermal conductivity—High degree of purity—Consistently uniform properties and dimensions—Low cost per ton of production.

International Graphite & Electrode Corp.

SAINT MARYS, PA.

anism operates in an oil bath sealed to retain the oil and prevent entry of coolant. Unit has a spindle speed of 1725 revolutions per minute, a maximum stroke of 1¼-inches and a

maximum collet capacity of 1/4-inch. It will handle tap sizes from 00-96 to 3/8-16, depending upon material. Operation may be at any angle with remote electrical controls.

22. Flexible Shaft Machine

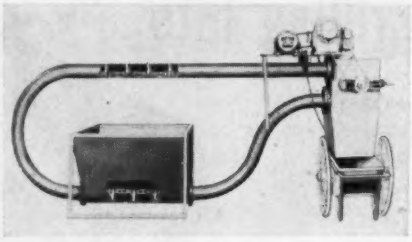
Of all welded steel construction throughout and with all pulleys and belts fully enclosed, the Streamflex flexible shaft machine, manufactured by Wyzenbeek & Staff Inc., 838 West Hubbard St., Chicago 22, Ill., has a cover which slides up for convenience in adjusting speeds or which may be removed for changing belts. The entire cabinet swivels on a ball bearing motor base with a 16-inch tool tray.

Machine is designed with low center of gravity to eliminate tipping. A locking shaft holder is incorporated to hold shaft and grinding wheel for stationary grinder. Five models are offered: ½ horsepower, 1400, 2400, 4500 revolutions per minute; ¾ horsepower, 1800, 3600 revolutions per minute; ¾ horsepower, 3600, 6000 revolutions per minute; 1 horsepower, 1800, 3600 revolutions per minute; and 1 horsepower, 3600, 6000 revolutions per minute.

23. Tank Cleaning Conveyor

Automatic removal and transfer of sediment from settling tanks without fluid removal is possible with the Houdaille conveyor, offered by Honan-Crane Corp., 636 Wabash Ave., Lebanon, Ind. Unit is an endless link chain, motor driven, on which 4-inch neoprene rubber flights are mounted at 6-inch intervals. It operates through the V-bottom of the settling tank, trapping sediment between the flights and conveying it through a 4-inch pipe line to a collection and disposal point.

Conveyor turns sharply after leaving tank, allowing fluid to drain back. Sediment is carried to dumping point where chain and flights emerge from pipe and discharge the load while making a vertical turn on the drive-sprocket, mounted on top of collection hopper. Chain is pin connected so that it may turn in any direction.



Speed of operation is 2 to 3 feet per minute, power being supplied by an electric motor through a gear reduction case.

24. Injection Press

An air actuated ram press capable of exerting a ram pressure of 8000 pounds at 80 pounds line pressure, the Versa Mold press, is manufactured by Ferracute Machine Co., Bridgeton, N. J., under a license arrangement with Radio Corp. of America. Developed for molding nylon, lucite, plexiglas, polystyrene and other thermoplastics, the press has a double acting air cylinder and press

A Complete Warehouse Service for...
SHEETS • PLATES
STRIP • STAINLESS STEEL
TIN PLATE • BARS • SHAPES
WIRE PRODUCTS • ALLOYS
Adequate Stocks!
Prompt Shipment!
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WORLD-WIDE EXPORTERS • 620 FIFTH AVENUE, NEW YORK CITY
Tri-Boro Steel Supply Co., Inc.

YOUR NEIGHBORS' CHILDREN CAN CONTRACT POLIO

AND YOUR NEIGHBOR NATION CAN SUFFER ECONOMIC PARALYSIS

We are spending money, time and research that polio—the disease that stagnates mind and body —does not invade our homes, nor those of our neighbors.

Yet, today, an equally virulent paralysis threatens our neighboring nation of China. AFTER HER FEVER HAS PASSED WILL THERE BE COMMUNISM?

That is a definite possibility. Therefore, just as we are spending millions to combat the dread threat of paralyzing diseases to those close to us, we should also spend sound dollars to assure economic health for our friendly neighbor nations—and consequently ourselves.

Basically, China is an agricultural country. She possesses a vast territory, rich resources and tremendous reserves of manpower, which could offer a fabulous market for the products of American Labor and Capital. Yet—as things are—her economic crisis is becoming more serious every day.

She needs our help. Without it, she may sink to the lowest point in her recent history. On the other hand, with our assistance and counsel, China is fully capable of assuming a place among the foremost nations of the world. AND BECOMING OUR GREATEST CUSTOMER.

Today—despite internal inflation—China's governmental debt is trivial. At most she owed $200,000,000 at home and $870,000,000 abroad. Since the end of the war, she has already repaid $135,000,000 of her foreign loans.

China's economy depends principally on farming. Her system—utterly unlike ours—is amazingly backward and antiquated. There is almost no farm machinery. The reason being that there are practically no agricultural banks. The *hsien* (county) the *hsiang* (village) and the *chen* (town) do not have financial institutions from which the farmer may borrow to buy seeds, tractors, or cultivators. No means have yet been provided for such private enterprise. However, with such aid, the Chinese farmer's efficiency could be multiplied fifty times. And this is aid which American business could provide.

In the past thirty years we have seen a great truth become evident. Communism has never flourished where great masses of people own land — especially farm land — prosperously. Such people will not subscribe to a theory which calls for public ownership of all property producing surplus income. China today is a nation of small farmers. It is for us to assist her to maintain her position of an economy of individual entrepreneurs.

COMMUNISM CAN NEVER FLOURISH WHERE MANY PEOPLE OWN MANY THINGS.

China is at the crossroads. Her people are competing in a world of tomorrow with the tools of yesterday. China now is a fellow-Republic. Right now it can be very simple to keep her so. That story will be written within the next five years.

A Chinese farmer and his tractor could readily become an outpost of Democracy.

Charles A. Koons

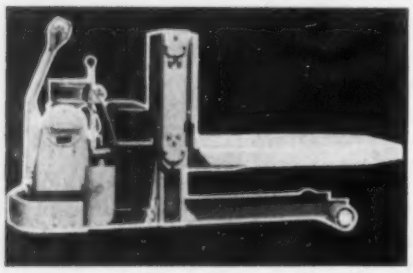
CHARLES A. KOONS & COMPANY, EXPORTERS • 620 FIFTH AVENUE • NEW YORK 20, N. Y.

mechanism enclosed in a streamlined frame.

Below the ram is an electrically heated material holding cylinder, vertically mounted on an arm and supported by coil springs to permit a limited up and down movement. Bottom of cylinder has a restricted outlet orifice. Attached to the frame is a lucite material hopper with capacity sufficient for several operations. Material temperature is thermostat-maintained up to 600° F.

25. Skid Handling Truck

Skid platforms of all heights may be handled with a single all-purpose motorized hand truck which operates without blocks, made by Automatic Transportation Co., 149 West 87th St., Chicago 20, Ill. It features a vertical hydraulic lift which raises the



platform a net lift of 13 inches—from 6 inches in low position to 19 inches in a raised position. It has ample clearance to negotiate ramps.

Truck is equipped with the standard Atco electric lift motor which actuates a vertical hydraulic piston. A full capacity load of 6000 pounds may be raised at a rate of slightly more than 1 inch per second. Platform height may be adjusted while truck is in horizontal motion. Trucks are made in both 4000 and 6000 pound load capacities.

DEVELOPED BY . . .

26. Chas. A. Schieren Co., 30-38 Ferry St., New York, N. Y., leather V-belting which can be cut from a roll and spliced to fit any required centers. Belts may be made endless, to fit any drive by a lapped splice or mechanical fastening.

27. General Foundry Service Corp., Oakland 6, Calif., line of quick release flasks and jackets of aluminum. Cam corner locks release the stripper line flask without rapping.

28. Titeflex Inc., Newark 5, N. J., flexible monel tubing for use where severe corrosion or high temperatures are encountered. It is supplied in four temperature ranges, depending upon inner core solder melting point.

29. Eutectic Welding Alloys Corp., New York 13, N. Y., new and improved gas and arc welding rods for both thin and heavy copper sections and for hard overlays at temperatures below copper melting point.

30. Wendt-Sonis Co., Hannibal, Mo., carbide tipped tool for production grooving of A, B and C belt size pulleys. Various carbide insert grades are furnished in hardened, rust-proofed shanks.

31. Speer Carbon Co., St. Marys, Pa., ACWeld carbon electrodes for alternating current welding. A clean, wide flame useful in brazing copper and brass tubing, in bending, forming, etc., is provided.

32. Peerless Pump Division, Food Machinery Corp., Los Angeles 31, Calif., type ACO centrifugal pump for handling corrosive fluids without danger of corrosion to pump parts. Capacities are up to 600 gallons per minute, heads up to 200 feet.

33. Electric Controller & Mfg. Co., Cleveland 4, O., line of nonbreakable resistor sections for electric motor controller and starter duty. Called Tab-Weld, resistor ends are off-set and spotwelded together.

34. Ward Leonard Electric Co., Mount Vernon, N. Y., Bulletin 4451 size 1 alternating current solenoid contactors for use as main line, reversing or accelerating contactors on machine tools, pumps, etc.

35. Davis Emergency Equipment Co., Inc., Newark 4, N. J., model 6 Vapotester, a highly sensitive two-range instrument for determination of hazardous conditions due to concentrations of gases or vapors.

36. Surface Combustion Corp., Toledo 1, O., oil standby equipment for use with most of its gas burner equipment. Equipment uses No. 3 furnace oil and has Btu input hour rating of the gas burner equipment.

37. Jack & Heintz Precision Industries Inc., Cleveland 1, O., a C1604-25, 1/6 horsepower split phase type capacitor motor for oil burner application. Operation is on 115 volts, 60 cycles at constant speed.

38. Ingersoll-Rand Co., Phillipsburg, N. J., J-10 utility Jackhamer, air powered, which may may be used for drilling in concrete, masonry, etc., or for paving breaking, chiseling or channeling.

39. Trumbull Electric Mfg. Co., Plainville, Conn., redesigned line of fuse puller switches rated at 60 amperes, 125/250 volts, alternating current. Units containing four and six branch circuits are made.

40. Division Lead Co., Chicago 22, Ill., Divco 71-point lead anodes, 12 feet long with special high conductivity hooks for chromium plating long sections of tubing and pipe.

41. Super Tool Co., Detroit 13, Mich., improved Bi-Axial grind for making heavy side and face milling cuts with solid carbide insert blade cutters. Cutter produces improved finish and has longer life.

42. Photocon Research Products, Pasadena 7, Calif., an improved indicator for measuring static and dynamic pressures. Frequency response is from 0 to 10,000 cycles per second.

43. Square D Co., Detroit 11, Mich., panelboard with thermal-magnetic circuit breaker. Due to small size of the MO4 unit, it affords increased gutter space.

44. Pulverizing Machinery Co., Summit, N. J., the Mikro-Collector dust collector which utilizes hard pressed wool felt as a filter medium in industrial air and gas filtration.

45. Thwing-Albert Instrument Co., Philadelphia 44, Pa., a battery operated electronic moisture meter for use in determining percentage of moisture in foundry sand, wood, etc.

46. Foxboro Co., Foxboro, Mass., model 42 pneumatic transmitter for industrial process measurements such as flow, static or differential pressure, liquid level, humidity, etc.

47. Johnson Corp., Three Rivers, Mich., solenoid valve used in conjunction with the company's compressor control to provide automatic control of water supply to water cooled compressor.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Steel Control Policy Determination Awaited

Immediate future outlook in steel markets dimmed by uncertainty over government allocation. Would disturb first quarter quotas. Producers press for voluntary action

IMMEDIATE future outlook in the iron and steel markets is dimmed by uncertainties attending determination of government policy with respect to allocations.

Consumer quotas for first quarter, 1948, have been generally set up by the mills, but these may be subject to revision as Washington is pressing for at least some voluntary allocations to satisfy pressing export and domestic requirements. Until the matter is definitely settled it is clear present commitments cannot be considered firm.

OPPOSE ALLOCATIONS—Last week, top steel producers, meeting with government representatives, opposed a mandatory allocation system. They did indicate, however, they might be willing to channel steel voluntarily in a few cases where the government reported existence of urgent foreign and domestic needs. One government request is reported for an increase of as much as 20 per cent in allotments for the car program.

SUPPLY-DEMAND UNBALANCED—Except for a few items, demand for finished steel continues in excess of output, and this despite record-breaking production. Indications are output this year will exceed 62 million tons, a new peacetime record. Still, the total will fall several million tons short of demand and prospects are for little change for months to come. One important steelmaker last week predicted 1948 would be a repetition of 1947 as regards steel supply.

SHEET ARREARAGES HEAVY—Producers of sheets will enter first quarter with arrearages as heavy as ever. Some mills report carryovers will be larger than at the beginning of the current quarter. Pipe, plate and bar makers also hold large backlogs.

PRICES DISPLAY STRENGTH—Rising production costs are exerting a strong upward influence on steel product prices but no early general change in base prices is in prospect. Tin plate is expected to rise shortly. Recently some revisions have been effected in extra cards.

Announcement of a cut of 1¼ cents per pound in nickel, effective Jan. 1, reflecting lowering of import duties at that time, has resulted in various inquiries from consumers as to the effect this reduction will have on stainless steel prices.

SCRAP UNTESTED—The end of the present test period in iron and steel scrap market is believed near. Trade leaders are hesitant to predict the outcome, though some expect a sharp upswing in prices just as soon as the mills resume buying on a large scale. For the moment, however, prices appear holding at the lower levels recently established, though New York brokers' buying prices have eased $1 per ton on the principal steelmaking grades and premium prices on remote scrap are fading out.

STEEL OPERATIONS—Ingot production continued at a high level last week with the estimated national rate unchanged at 96.5 per cent of capacity. Operations increased 3 points to 93.5 per cent in Cleveland and ½ point in Pittsburgh and Chicago to 101 per cent and 95 per cent, respectively. The operating rate dropped 7½ points in Wheeling to 86 per cent and 1 point in Youngstown to 90 per cent.

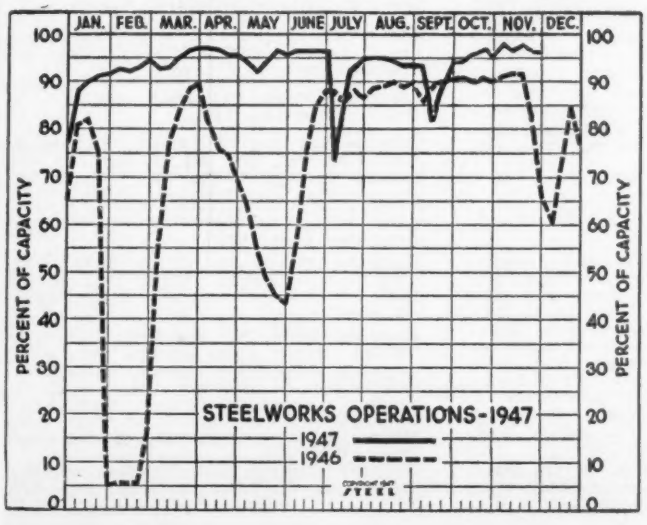
PRICE COMPOSITES—No changes were recorded last week in STEEL's composite market price averages, which held at $76.09 for finished steel, $57.20 for semifinished steel, and $40.42 for steelmaking scrap for the week as well as the month of November. Average for steelmaking pig iron held at $36.42 last week, making the November average $36.38 compared with $36.18 in October.

DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Nov. 29	Change	Same Week 1946	Same Week 1945
Pittsburgh	101	+ 0.5	57	78.5
Chicago	95	+ 0.5	74.5	93.5
Eastern Pa.	93.5	None	58	78
Youngstown	90	— 1	40	80
Wheeling	86	— 7.5	85.5	90
Cleveland	93.5	+ 3	92	85
Buffalo	88.5	None	51	88.5
Birmingham	103	None	47	95
New England	87	None	90	82
Cincinnati	87	None	84	67
St. Louis	78	None	72.5	68
Detroit	92	None	84	91
Estimated national rate	96.5	None	65.5	83.5

Based on weekly steelmaking capacity of 1,749,928 net tons for 1947; 1,762,381 net tons for 1946; 1,831,636 tons for 1945.



COMPOSITE MARKET AVERAGES

	Nov. 29	Nov. 22	Nov. 15	One Month Ago Oct., 1947	Three Months Ago Aug., 1947	One Year Ago Nov., 1946	Five Years Ago Nov., 1942
Finished Steel	$76.09	$76.09	$76.09	$75.41	$75.41	$64.45	$56.73
Semifinished Steel	57.20	57.20	57.20	56.80	56.80	40.60	36.00
Steelmaking Pig Iron	36.42	36.42	36.41	36.18	36.06	27.50	23.00
Steelmaking Scrap	40.42	40.42	40.42	39.85	39.00	22.22	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. **Semifinished Steel Composite:**—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. **Steelmaking Pig Iron Composite:**—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. **Steelworks Scrap Composite:**—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Materials

	Nov. 29, 1947	Oct., 1947	Aug., 1947	Nov., 1946
Steel bars, Pittsburgh	2.90c	2.90c	2.90c	2.50c
Steel bars, del. Philadelphia	3.318	3.301	3.28	2.86
Steel bars, Chicago	2.90	2.90	2.90	2.50
Shapes, Pittsburgh	2.80	2.80	2.80	2.35
Shapes, del. Philadelphia	2.954	2.947	2.94	2.48
Shapes, Chicago	2.80	2.80	2.80	2.35
Plates, Pittsburgh	2.95	2.95	2.95	2.50
Plates, del. Philadelphia	3.17	3.162	3.15	2.558
Plates, Chicago	2.95	2.95	2.95	2.50
Sheets, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.425
Sheets, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.275
Sheets, No. 10 galv., Pittsburgh	3.90	3.90	3.90	†4.05
Sheets, hot-rolled, Gary	2.80	2.80	2.80	2.425
Sheets, cold-rolled, Gary	3.55	3.55	3.55	3.275
Sheets, No. 10 galv., Gary	3.90	3.90	3.90	†4.05
Strip, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.45
Strip, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.05
Bright basic, bess. wire, Pittsburgh	3.675	3.675	3.675	3.05
Wire nails, Pittsburgh	4.625	4.25	4.25	3.75
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	*$5.25

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00	$60.00	$38.00
Slabs, Pittsburgh, Chicago	47.50	47.50	47.50	39.00
Rerolling billets, Pittsburgh	47.50	47.50	47.50	39.00
Wire rod $\frac{5}{16}$ to $\frac{1}{4}$-inch, Pitts.	3.05c	2.925c	2.925c	‡2.30c

‡ Base, No. 5 to $\frac{5}{16}$-in.

Pig Iron

	Nov. 29, 1947	Oct., 1947	Aug., 1947	Nov., 1946
Bessemer, del. Pittsburgh (N.&S. sides)	$37.913	$37.879	$37.83	$29.77
Basic, Valley	36.00	36.00	36.00	28.00
Basic, eastern del. Philadelphia	38.84	38.78	38.72	29.93
No. 2 fdry., del. Pgh. (N.&S. sides)	37.41	37.379	37.33	29.27
No. 2 fdry., del Philadelphia	39.34	39.28	39.22	30.43
No. 2 foundry, Chicago	36.00	36.00	36.00	28.50
No. 2 foundry, Valley	36.50	36.50	36.50	28.50
Southern No. 2, Birmingham	34.88	34.88	34.51	24.88
Southern, No. 2, del. Cincinnati	38.74	38.544	39.38	28.94
Malleable, Valley	36.50	36.50	36.50	28.50
Malleable, Chicago	36.50	36.50	36.50	28.50
Charcoal, low phos., fob Lyles, Tenn.	50.00	46.40	44.00	33.00
Ferromanganese, fob cars, Pittsburgh	151.00	151.00	140.25	140.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$40.00	$39.90	$39.50	$23.00
Heavy melt. steel, No. 2, E. Pa.	42.50	39.50	38.35	21.90
Heavy melt. steel, No. 1, Chicago	38.75	39.55	39.625	21.75
Heavy melt. steel, No. 1, Valley	39.75	39.50	40.50	20.00
Heavy melt. steel, No. 1, Cleveland	39.25	38.25	38.81	19.50
Heavy melt, steel, No. 1, Buffalo	42.50	39.00	40.88	19.25
Rails for rerolling, Chicago	55.50	51.00	47.125	24.25
No. 1 cast, Chicago	49.00	46.40	43.50	29.00

Coke

Connellsville, beehive furnace	$12.25	$12.15	$12.00	$8.75
Connellsville, beehive foundry	14.50	14.50	14.50	9.50
Chicago, oven foundry, del.	18.60	18.52	18.50	15.10

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $80-$85. Forging quality $46, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $45-$50, sales by smaller interests on negotiated basis at $65 or higher.

Forging Quality Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $55-$58; Detroit, del., $61; eastern Mich., $62.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66, del. Detroit $69, eastern Mich., $70.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Youngstown, $60; sales in open market $66 to $92.

Skelp: Pittsburgh, Youngstown, 2.60c-2.65c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69-$70.

Wire Rods: Pittsburgh, Chicago, Birmingham, $\frac{7}{32}$ to $\frac{1}{4}$-in., inclusive, $2.80-3.30 per 100 lb. $\frac{5}{16}$ to $\frac{47}{64}$-in., inclusive, $2.75, Cleveland; Galveston, $2.95; Worcester, $2.90-2.95. San Francisco (base del.), $3.52.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, base, 20 tons one size, 2.90c; Detroit, del., 3.05c; eastern Mich., 3.10c; New York, del., 3.351c; Phila., del., 3.318c; San Francisco (base, del.), 3.63-3.95c; Los Angeles (base, del.), 3.625-3.86c; Seattle, 3.85c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c; Detroit, del., 3.45c; eastern Mich., 3.50c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.70c; Toledo, 3.75c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c; Detroit, del., 4.25c; eastern Mich., 4.30c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.33c; Los Angeles (base, del.), 3.325c; Seattle, 3.88c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo. Prices upon application.

Iron Bars: Single refined, Pittsburgh 7.15c-†7.70c; double refined, 8.00-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

† Hand puddled.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Granite City, 3.175c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; Philadelphia, del., 3.02c; New York, del., 3.12c; Los Angeles (base, del.), 3.54c; San Francisco, (base, del.), 3.545c. (Andrews Steel Co. quotes Middletown, O., base for shipment to Detroit. Alan Wood Steel Co., Conshohocken, Pa., quotes 3.40c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.70c; eastern Mich., del., 3.75c; New York, del., 4.001c; Philadelphia, del., 3.968c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, 3.85c-3.95c; Youngstown, Sparrows Point, Canton, Middletown, base, 3.95c; Granite City, 4.05c; New York, del., 4.27c; Philadelphia, del., 4.17c; Los Angeles (base, del.), 4.62c; San Francisco (base, del.), 4.625c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 3.95c-4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc; corrugated 10 cents extra) Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.45c-4.55c; copper-iron or pure iron, 4.80c-4.90c. Granite City 4.65c and 5.00c, respectively. Los Angeles (base, del.), 5.24c; San Francisco (base, del.), 5.245c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Stainless-Clad 20%: Pittsburgh, Washington, Coatesville, Pa., No. 304, 22.00c; No. 410, 20.00c; No. 430, 20.50c; No. 446, 27.00c. Prices include annealing and pickling.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.85c-4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 3.90c-3.95c; Granite City, 4.05c; Detroit, del., 4.10c; eastern Mich., 4.15c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. Armature: Pittsburgh, Chicago, Gary, 4.80c; Granite City, Ill., Kokomo, Ind., 4.90c. Electrical: Pittsburgh, Chicago, Gary, 5.30c; Granite City, Kokomo, 5.40c. Motor: Pittsburgh, Chicago, Gary, 6.05c; Granite City, 6.15c. Dynamo: Pittsburgh, 6.75c; Granite City, 6.85c. Transformer 72, 7.25c; 65, 7.95c; 58, 8.65c; 52, 9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; San Francisco (base, del.), 3.605c; Los Angeles (base, del.), 3.60c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.55c; Chicago, base, 3.65c; Detroit, del. 3.70c; eastern Mich., 3.75c; Worcester, base, 3.75c-4.10c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c, over 0.60 to 0.80, 5.65c; over 0.80 to 1.05, 7.15c; over 1.05 to 1.35, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.90c; Granite City, Birmingham, Sparrows Point, 4.00c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-lb base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.

Roofing Ternes: Pittsburgh, per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $14.10.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c: Coatesville, Claymont, 3.15c*; Geneva, Utah, (base, del.), 3.125c; New York, del. 3.21c; Phila., del., 3.17c; St. Louis, del., 2.77c; Boston, del., 3.423c; San Francisco and Los Angeles, del., 3.67c for sizes and grades produced at Geneva, 3.76c for sizes and grades produced at Fontana, Calif. (Central Iron & Steel Co., Harrisburg, Pa., 4.45c, basing points.)

* At Claymont, Del., 3.30c base price applies on all grades lower than flange quality steel.

Floor Plates: Pittsburgh, Chicago, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.50c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c. Pittsburgh, Washington, Coatesville, Pa., 20% stainless-clad, base prices including annealing and pickling: No. 304, 24.00c; No. 410, 22.00c; No. 430, 22.50c; No. 446, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.02c; Phila., del., 2.954c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.41c-3.47c for sizes produced at Torrance, Calif., beyond sizes at Geneva; Los Angeles and San Francisco, del., 3.52c for sizes produced at Geneva; San Francisco, del., 3.41c for sizes produced at Fontana, Calif.

Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads

Bright, basic or bessemer.....*$3.55-3.80
Spring (except Birmingham)....**$4.25-**4.50

Wire Products to Trade

Nails

Standard and cement-coated .....†$4.25-5.00
Galvanized .....‡$4.00-4.75
Staples, polished and galvanized.....$4.25-5.00

Wire, Merchant Quality

Annealed (6 to 8 base)..... §$4.20
Galvanized (6 to 8 base)..... §$4.65
(Fob Pittsburgh, Chicago, Birmingham, per base column)
Woven fence, 15 gage and heavier.... ††91-101
Barbed wire, 80-rod spool ..... ††101
Barbless wire, twisted 101
Fence Posts (no clamps)..... ††90
Bale ties, single loop ..... ††91

* Worcester, $3.65, Duluth, $3.60, base. San Francisco (base, del.), $4.56, bright basic only.

** Worcester $4.60, Duluth and Trenton, N. J., $4.75, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.

† Worcester $4.55, Cleveland $4.35, base. San Francisco (base, del.) $5.33.

‡ Duluth $4.00, Cleveland $4.10, base. San Francisco (base, del.) $5.08.

§ Worcester $4.30, annealed; $4.75, galvanized. Duluth $4.20, annealed; $4.65, galvanized. San Francisco (base, del.) $5.21, annealed; $5.66, galvanized.

†† San Francisco (base, del.): Woven fence, 114; barbed wire, 121; bale ties, 115. Duluth (base): Woven fence, 91; barbed wire, 101; fence posts 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.

Relaying, 60 lb and over fob warehouse $55-$56 per net ton.

Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.05 per 100 lb, fob mill; $3.40 base, Seattle; $3.20, base, Pittsburg, Calif. Splice bars, $3.25 per 100 lb, fob mill. Standard spikes, 4.85c; screw spikes, 6.75c. Axles, 4.10c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld			Butt Weld	
In	Blk.	Gal.	In	Blk.	Gal.
⅛	46	19½	1	56	41½
¼	47	25	1¼	56½	42
⅜	44	22	1½	57	42½
½	50½	34½	2	57½	43
¾	53½	38½	2½ & 3..	58	43½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2 ...	49	34	48½	33½	48	33
2½-3.	52	37	51½	36½	51	36
3½-6.	54	39	53½	38½	53	38

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

	Butt Weld		Butt Weld
In.		In.	
⅛	45	1	55
¼	46	1¼	55½
⅜	43	1½	56
½	49½	2	56½
¾	52½	2½ & 3.....	57

In.	Lap Weld	Elec. Weld	Seamless
2	48	47½	47
2½ & 3	51	50½	50
3½-6	53	52½	52
8	53½	53	52½
10	53	52½	52
12	52	51½	51

Boiler Tubes: Net base prices per 100 ft, fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

		—Seamless—		—Elec. Weld—	
O.D.		Hot	Cold	Hot	Cold
Sizes	B.W.G.	Rolled	Drawn	Rolled	Drawn
1"	13	....	$11.87	$11.51	$11.51
1¼"...	13	....	14.06	11.48	13.64
1½"...	13	$13.08	15.69	12.69	15.22
1¾"...	13	14.88	17.85	14.43	17.31
2".....	13	16.67	19.99	16.17	19.39
2¼"...	13	18.58	22.29	18.02	21.62
2¼"...	12	20.47	24.54	19.86	23.80
2½"...	12	22.42	26.87	21.75	26.06
2¾"...	12	23.76	28.48	23.05	27.63
3".....	12	24.93	29.90	24.18	29.00
3¼"...	11	29.03	34.81	28.16	33.77
3½"...	11	31.17	37.39	30.23	36.27
4".....	10	38.69	46.38	37.53	44.99
4½"...	9	51.28	61.50	....	....
5".....	9	59.39	71.18	....	....
6".....	7	91.13	109.27	....	....

Pipe, Cast Iron: Class B, 6-in. and over $74.50 per net ton, Birmingham; $79.50, Burlington, N. J.; $86.12, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
⅝ and ⅝ x 6-in. and shorter.....	46 off
¾-in. and larger x 6-in. and shorter...	43 off
All diameters longer than 6-in.	41 off
Tire bolts	35 off
Step bolts	43 off
Plow bolts	54 off
Lag bolts	
All diameters 6 in. and shorter.....	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller.....	46 off	.....
½-in. and smaller.....	.....	44 off
⅝-in.-1-in.	44 off	.....
⅞-in.-1-in.	.....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger.....	.....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws
(Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright).....	53 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter.....	48 off
¾, ⅞, & 1 x 6 and shorter.....	44 off

Square Head Set Screws

Upset 1-in. and smaller.....	57 off
Headless, ¼-in. and larger.....	40 off
No. 10 and smaller.....	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural ½-in. and larger.....	5.65c
Lebanon, Pa.	5.80c
⅞-in. and under	55 off
Lebanon, Pa. .....55 off plus 15c per cwt.	

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1-$2 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301....	26.00c	29.50c	37.00c	22.00c	28.00c
302....	26.00	29.50	37.00	23.50	30.50
303....	28.50	31.50	39.00	29.50	36.00
304....	27.50	31.50	39.00	25.50	32.50
308....	31.50	37.00	44.50	31.00	38.00
309....	39.00	43.50	51.00	40.50	51.00
310....	53.50	56.50	57.50	53.00	61.00
316....	43.50	48.00	52.00	43.50	52.00
321....	31.50	37.00	44.50	32.00	41.50
347....	36.00	41.50	49.00	36.00	45.50
431....	21.00	24.00	31.50	19.00	24.50
440A..	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403....	23.50	27.00	32.00	23.00	29.50
410....	20.50	23.50	29.00	18.50	24.00
416....	21.00	24.00	29.50	20.00	25.50
420....	26.00	31.00	36.50	26.00	39.50
430....	21.00	24.00	31.50	19.00	24.50
430F ..	21.50	24.50	32.00	20.50	27.00
442....	24.50	28.00	35.50	26.00	35.00
443....	24.50	28.00	35.50	26.00	35.00
446....	30.00	33.00	39.50	38.00	56.50
*501...	9.00	13.00	17.50	13.00	18.50
*502...	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304....	....	24.00	22.00	....	....
410....	....	22.00	20.00	....	....
430....	....	22.50	20.50	....	....
446....	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., base	$37.00	$37.50	$38.00	$38.50
Newark, N. J., del.	39.02	39.52	40.02	40.52
Brooklyn, N. Y., del.	....	40.80	44.30	....
Philadelphia, del.	38.84	39.34	39.84	40.34
Birmingham, base	32.88*	33.38*	....	....
Baltimore, del.	....	40.42	....	....
Chicago, del.	....	36.72	....	....
Cincinnati, del.	....	38.74	....	....
Newark, N. J., del.	....	39.14	....	....
Philadelphia, del.	....	38.96	....	....
St. Louis, del.	....	37.77	....	....
Buffalo, base	36.00*	36.00*	36.50*	37.00
Boston, del.	43.128	43.128	46.63	44.13
Rochester, del.	38.02	38.02	38.52	39.02
Syracuse, del.	38.75	38.75	39.25	39.75
Canton, Massillon, O., base	35.50	36.00	36.50	....
Chicago, base	35.50	36.00	36.50	37.00
Milwaukee, del.	36.95	37.45	37.95	38.45
Muskegon, Mich., del.	....	40.21	40.71	....
Cleveland, fob furnace	35.50*	36.00*	36.50*	37.00
Akron, del.	37.34	37.84	38.34	38.84
Duluth, base	36.00	36.50	37.00	37.50
Erie, Pa., base	35.50	36.00	36.50	37.00
Everett, Mass., base	....	45.00	45.50	....
Granite City, Ill., base	36.50	37.00	....	....
St. Louis, del.	37.33	37.83	....	....
†**Neville Island, Pa.,** base	36.00	36.50	36.50	37.00
Pittsburgh, del., N.&S. Sides	36.913	37.413	37.413	37.913
Provo, Utah, base	36.00	36.50	....	....
Seattle, Tacoma, Wash., del.	....	43.03	....	....
Portland, Oreg., del.	....	43.03	....	....
Sharpsville, Pa., base	36.00	36.50	36.50	37.00
Steelton, Pa., base	37.00	37.50	38.00	38.50
Struthers, O., base	36.50	37.00	37.00	37.50
Swedeland, Pa., base	41.00	41.50	42.00	42.50
Troy, N. Y., fob furnace	39.50	....	40.00	....
Toledo, O., base	35.50	36.00	36.50	37.00
Cincinnati, del.	39.35	39.85	....	....
Youngstown, O., base	36.00	36.50	36.50	37.00
Mansfield, O., del.	39.28	39.78	39.78	40.28

† To Neville Island base add: 72.6c for McKees Rocks, Pa., $1.111 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; $1.463 Oakmont, Verona; $1.639 Brackenridge.

* Republic Steel Corp. quotes $3 a ton higher at Birmingham, effective Aug. 13; $4.00 higher for No. 2 foundry and malleable and $3.50 higher for basic at Buffalo, and $5.50 higher at Cleveland, effective on shipments during week ended Nov. 30.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)....$45.50
6.51-7.00..$46.75 9.01- 9.50. 53.00
7.01-7.50.. 48.00 9.51-10.00. 54.25
7.51-8.00.. 49.25 10.01-10.50. 55.50
8.01-8.50.. 50.50 10.51-11.00. 56.75
8.51-9.00.. 51.75 11.01-11.50. 58.00

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton. **Electric Furnace Silvery Pig Iron:** Si 14.01-14.50%, $70.75, Jackson, O.; $73.75, Niagara Falls; $73, open-hearth and foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn....$50.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $36.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $42.00. Philadelphia, $44.376, delivered. Intermediate phosphorus, Central furnace, Cleveland, $39.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$12.00-$12.50
Connellsville, foundry	14.00- 15.00
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$17.85
Chicago, outside del.	17.60
Chicago, del.	18.60
Terre Haute, del.	18.15
Milwaukee, ovens	18.25
New England, del.	19.60
Birmingham, del.	15.10
Indianapolis, ovens	17.00
Cincinnati, del.	18.10
Ironton, O., ovens	16.00
Erie, Pa., del.	18.35
Painseville, O., ovens	17.10
Cleveland, del.	18.50
Buffalo, del.	19.20
Detroit, del.	18.25
Philadelphia, ovens	16.90
Swedeland, Pa., ovens	16.90
Portsmouth, O., ovens	16.00
Fairmont, W. Va., ovens	16.25
Pittsburgh, del.	18.21

Coal Chemicals

Spot, cents per gallon

Pure and 90% benzol	19.00†
Toluol, two degrees	23.00
Industrial xylol	25.00*
Solvent naphtha	25.00*

Per pound fob works

Phenol (car lots, returnable drums)	12.00§
Do., less than carlots	12.75§
Do., tank cars	11.00§

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "household use"	11.00*

Per ton, bulk, fob plants

Sulphate of ammonia	$35.00‡

* Effective Aug. 1. † Freight allowed up to 2 cents. ‡ Effective July 21. § Effective Oct. 1.

Refractories

Per 1000, fob shipping point

Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	75.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low-Heat Duty

Pa., Md., Ohio	56.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago	79.00
Birmingham, Ala.	70.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	24.00
Single bags	28.00

Dolomite

Domestic, dead-burned, bulk, net ton, fob Bilmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.05; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre, Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.20

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%.	13.50
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$30–$32

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 65.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	28.50
50% no ratio	29.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., Mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	5.85	...	...	...	...	...	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.30	5.30*	5.30*	5.30	...	...	...	...	...
Shapes, structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

* Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS			Structural Shapes	PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½" & up	H-R Alloy (8-4140)		Carbon ⅝"-¾"	Floor ⅝" & Thicker
Boston (city)	4.96	6.03[4]	5.73[4]	6.16[4]	7.41[4]	5.04	6.73	4.95	5.63	7.22	4.82	5.11	6.79
††New York (city)	4.91	6.12	5.82[8]	6.11	7.36	5.03	....	5.02	5.57	7.00[9]	4.75	5.06	6.76
New York (country)	4.76	5.97	5.67[8]	5.96	7.21	4.88	....	4.87	....	....	4.60	4.91	6.61
Philadelphia (city)	4.67	6.28	5.88	5.87	7.12	4.78	5.68	4.83	5.53	6.95[9]	4.55	4.82	6.31
Philadelphia (country)	4.57	6.18	5.78	....	....	4.68	5.58	4.73	....	6.85[9]	4.45	4.72	6.21
Baltimore (city)	4.31†	5.91	5.61	5.71	6.96	4.76	....	4.81	5.51	....	4.68	4.76	6.26
Baltimore (country)	4.21†	5.81	5.51	5.50	6.75	4.66	....	4.71	....	....	4.58	4.66	6.16
Washington (city)	4.75	....	....	....	....	4.95	....	5.00	5.60[19]	....	4.90	4.95	6.60
Washington (country)	4.65	....	....	....	....	4.85	....	4.90	....	....	4.80	4.85	6.50
Norfolk, Va.	4.80	....	....	....	....	....	....	5.10	5.90	....	5.05	5.05	6.80
Memphis, Tenn. (city)	4.82[20]§§	5.87[20]†	....	6.37	....	5.02[20]	....	4.97[20]	5.87	....	4.97[20]	5.17[20]	6.87[20]
Memphis, Tenn. (country)	4.72[20]§§	5.77[20]†	....	6.27	....	4.92[20]	....	4.87[20]	5.77	....	4.87[20]	5.07[20]	6.77[20]
Buffalo (city)	4.45	....	5.20[8]	6.00	....	4.70	5.65	4.40	5.10	6.65	4.40	4.95	6.20
Buffalo (country)	4.30	....	5.05[8]	5.55	....	4.25	5.50	4.25	4.95	6.65	4.25	4.45	5.75
Pittsburgh (city)	4.25§§	....	5.10[8]†	5.65	6.90	4.35	5.35	4.40	5.10	6.65	4.40	4.60	5.90
Pittsburgh (country)	4.15§§	....	4.90[8]†	5.50	6.75	4.20	5.20	4.25	4.95	6.65	4.25	4.45	5.75
Cleveland (city)	4.45	5.50[8]	5.20[8]	5.79	7.04	4.52	5.35	4.40	5.10	6.93	4.65	4.60	6.15
Cleveland (country)	4.30	5.35[8]	5.05[8]	....	....	....	5.20	4.25	4.95	....	....	4.40	....
Cincinnati	4.671	5.516[8]	....	5.716	6.466	4.694	....	4.703	5.353	....	4.744	4.903	6.244
Detroit	4.55	....	5.30	....	....	4.72	5.63	4.50	5.22	7.10	4.77	4.88	6.28
Indianapolis	4.55	5.32[8]	....	5.87	7.12	4.65	5.90	4.70‡‡	5.40	8.85	4.70	4.90	6.35
Chicago (city)	4.45	5.50[8]	5.20[8]	5.65	6.90	4.35	5.45	4.40	5.10	6.65[9]	4.40	4.60	6.05
Chicago (country)	4.30	5.35[8]	5.05[8]	5.50	6.75	4.20	5.30	4.25	4.95	6.65[9]	4.25	4.45	5.90
Milwaukee	4.629	5.679[8]	5.379[8]	5.829	7.079	4.529	5.629	4.579	5.279	6.979[9]	4.579	4.779	6.229
St. Louis	4.749	5.799[9]	5.499[8]	5.974	7.224	4.649	5.774	4.699	5.424[13]	7.124	4.699	4.899	6.349
Birmingham (city)	4.45[20]§§	....	....	5.65	....	4.45[20]	....	4.40[20]	5.93[22]	....	4.40	4.65	6.86
Birmingham (country)	4.30[20]§§	....	....	5.50	....	4.30[20]	....	4.25[20]	....	....	4.25	4.50	....
New Orleans	4.98[20]**	....	6.29[18]	....	....	5.18[20]	....	5.13[20]**	6.29[11]	....	5.03[20]**	5.33[20]	7.29[20]
Omaha, Nebr.	5.365	....	....	6.565	7.815	5.265	....	5.315	6.015	....	5.315	5.515	6.965
Houston, Tex.	5.50	....	....	5.50	7.70	5.25	....	5.30	6.80[13]	7.70	5.85	5.35	6.50
Los Angeles (city)	5.75	7.75[8]	7.45[8]	7.40	8.80	6.05	8.70	5.50	7.35[22]	9.35[16]	5.35	5.55	7.65
Los Angeles (country)	5.60	7.60[8]	7.30[8]	7.25	8.65	5.90	8.55	5.35	7.20[1]	9.20[16]	5.20	5.40	7.50
San Francisco	5.20[21]	6.65[8]	....	6.85[8]	7.75[8]	5.75[21]	8.70[15]	5.05[21]	7.00[13]	9.35	5.20[21]	5.30[21]	7.10[21]
Seattle, Tacoma, Wash.	5.30[17]§§	....	7.10[8]‡	6.70	....	5.60[17]	....	5.45[17]	7.45[19]	8.50[12]	5.25[17]	5.45[17]	7.55[17]
Portland, Oreg.	5.30[17]§§	....	7.10[8]‡	6.70	....	5.60[17]	....	5.45[17]	7.45[19]	....	5.25[17]	5.45[17]	7.55[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [15]—2000 lb and over; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § as rolled; **add 0.4¢ for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si.). Carlot per gross ton, $47, Palmerton, Pa., $51, Pittsburg. 16% to 19% Mn., $46, Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $153, ton lot $165, less ton $172; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%.

West Coast Prices: Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23c, ton lot 23.6c, less ton 24.2c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17c, ton lot 17.6c, less ton 18.2c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.4c per lb of alloy, carload packed, 7.95c, ton lot 8.45c, less ton 8.95c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l., lump, bulk 17.6c per lb of contained Cr, c.l., packed 18.2c, ton lot 18.8c, less ton 19.5c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, c.l., 8MxD, bulk 19.1c per lb of contained Cr, c.l., packed 19.7c, ton lot 20.4c, less ton 21.35c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 27c per lb of contained Cr, 0.04% C 26c, 0.05% C 25.5c, 0.06% C 25c, 0.10% C 24.5c, 0.15% C 24.0c, 0.20% C 23.75c, 0.50% C 23.5c, 1% C 23.0c, 2% C 22.5c. Carload packed add 0.8c, ton lot add 1.35c, less ton add 2.35c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, and C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 23c per lb of contained chromium, carload, packed 23.8c, ton lot 24.35c, less ton 25.35c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D, bulk, max. 0.50% C grade, 87c per lb of contained chromium, carload packed 88c, ton lot 89.5c, less ton 91.5c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 8.8c per lb of contained Si, carload packed 10c, ton lot 10.65c, less ton 11.3c; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.). Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.2c per lb of contained Si, carload packed 12.25c, ton lot 12.85c, less ton 13.45c; Central, add 0.3c for c.l. and 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 12.7c per lb of contained Si, carload packed 13.7c, ton lot 14.25c, less ton 14.8c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 14.35c per lb of contained Si, carload packed 15.35c, ton lot 15.85c, less ton 16.35c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.65c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe). Eastern Zone, c.l., lump, bulk, regular, 16.5c per lb of Si, c.l. packed 17.5c, ton lot 18c, less ton 18.5c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade, analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract basis fob Niagara Falls, N. Y., lump per lb c.l. 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c; smaller lots, 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 11.1c per lb of briquet, carload packed 11.6c, ton lot 12c, less ton 12.4c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8c per lb of briquet, c. l. packed, 8.6c, ton lot 9c, less ton 9.4c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si) Eastern Zone, contract, c.l., bulk 7.65c per lb of briquet, c.l. packed 8.25c, ton lot 8.65c, less ton 9.05c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 4.65c per lb of briquet, c.l. packed 5.25c, ton lot 5.65c, less ton 6.05c. (Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 4.8c, c.l. packed 5.4c, ton lot 5.8c, less ton 6.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 16.75c per lb of alloy, carload packed 17.35c, ton lot 18.85c, less ton 19.85c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.
Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 15.5c per lb of alloy, carload packed 16.5c, ton lot 18c, less ton 19c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l. and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.), $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.
Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.
Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.
Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.
Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.55c, ton lot 6.9c, less ton 7.25c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.
35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.4c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western, add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone, contract, ton lots. 1" x D, $1.20 per lb of alloy, freight allowed. Less ton lots $1.30: Central, add 0.75c; Western, add 2.9c, freight allowed. Spot add 5c.
Borosil: (3 to 4% B, 40 to 45% Si). $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.
Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.
Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.50 per lb of contained Cb, less ton $2.55; Central, add 1.65c; Western, add 6.45c. Freight allowed. Spot, add 10c.
CMSZ Mixes: No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, bulk 15.75c per lb of material, carload packed 16.5c, ton lot 17.25c, less ton 18c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.
Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Eastern Zone, carload, packed, 1" x D, 37c per lb of alloy, ton lot 39c, less ton 41c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.
SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 14.3c per lb of alloy, ton lot 15.05c, less ton 15.8c; Central add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.
Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.
Ferrophosphorus: 17-19% based on 18% P content with unitage of $3 for each 1% of P above or below the base) Gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.
Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Firmer Price Tone Develops in Metal Markets

Active inquiry strengthens undertone of copper, lead and zinc markets. Secondary aluminum prices rise

NEW YORK—Inquiry for copper, lead and zinc continued heavy last week and indications are that sales during December will be large. Active demand for metals during the last few weeks has imparted a strong undertone to all markets. Keen competition for available supplies of aluminum scrap has resulted in a further advance of 1/4 to 1/2-cent a pound in secondary aluminum.

COPPER — Consumption of refined copper by the copper and brass fabricators increased 12,559 tons in October to a total of 120,972 tons, the largest tonnage reported since January, according to figures compiled by the Copper Institute. Deliveries from primary producers to the fabricators increased to 112,202 tons from 95,582 in September, or 8770 tons less than consumed. Total stocks of copper in fabricators' hands at the end of October amounted to 417,765 tons, a decline of 8658 tons from the previous month. Fabricators' unfilled orders declined 28,653 tons to only 359,250 tons, a new low since 1945. The deficiency in supplies as compared with orders was cut to 128,635 tons, the smallest recorded since February, 1941.

LEAD — Shipments of refined lead increased 12,764 tons in October to a total of 56,247 tons, the largest reported since August, 1942. Total shipments during the first ten months of this year amounted to 501,033 tons compared with 336,056 tons in the like 1946 period. Stocks of lead at refineries declined 6015 tons during the month to a total of 28,370 tons, the smallest volume reported since the end of January, 1945. Production of refined lead increased 3421 tons in October to a total of 50,248 tons. Output in the first ten months of this year amounted to 482,898 tons compared with 333,414 tons in the like 1946 period.

Total stocks of refined lead held by the Office of Metals Reserve as of Oct. 31 amounted to 4650 tons, which still remains unchanged from September.

ZINC — Stocks of zinc held by OMR as of Oct. 31 underwent a further large reduction of 79,210 tons to a total of 225,721 tons, of which 35,015 tons was slab zinc and 190,706 tons was the zinc content of ores and concentrates. OMR's stock of Grade A zinc at the end of October amounted to only 16,643 tons, indicating that 59,280 tons were earmarked for the permanent Army and Navy Munitions Board stockpile, making a total of such transferrals during the past two months of 122,311 tons. Indications are that total smelter and OMR stocks are now approximately 80,000 tons, or the smallest volume since December, 1942.

TIN — Malay States have agreed to bring the export tax on tin concentrates down to a parity with the rate on pig tin. However, under the Geneva agreement, they reserve the right to retain a preference on concentrates to the extent that the United States subsidizes its tin smelting industry. Supply of tin in the United States in October totaled 8967 tons. Stocks in the hands of OMR increased from 16,356 tons at the end of September to 21,309 tons a month later. Allocations in October came to 4690 tons.

ALUMINUM — A further advance in scrap aluminum prices, due to stiff competition for some of the more desirable grades, resulted in a further mark-up of 1/4 to 1/2-cent in remelt aluminum ingot prices, except No. 12 ingot which held unchanged at 15.00c. Representatives of Reynolds Metals Co., Louisville, Ky., appeared at hearings in support of the reduction in the tariff on bauxite. They urged an increase of the tariff on raw aluminum finished products, but these were reduced.

NONFERROUS METAL PRICES

Copper: Electrolytic, carloads 21.50c, delivered Conn.; Lake, 21.62½c del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c 1000-4999 lb; 1½c, 500-999 lb; 2c 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 17.50c-18.00c; 88-10-2 (No. 215) 25.75-26.25c; 80-10-10 (No. 305) 21.50-22.00c; No. 1 yellow (No. 405) 13.75-14.50c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 15.25-15.50c; No. 12 foundry alloy (No. 2 grade) 14.75-15.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 14.75-15.00c; grade 2 (92-95%) 13.75-14.00c; grade 3 (90-92%) 13.25-13.50c; grade 4 (85-90%)12.75-13.00c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00c-56.00c; 25 to 99 lb, 42.00c-46.00c; 100 to 4000 lb, 35.00c-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 224-999 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35.00c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $80-$83 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $20.50 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg) $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 74.62½c, per ounce.

Platinum: $62-$65 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.

Sheet: Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 38.46c; nickel silver, 18%, 42.49c; phosphor bronze, grade A, 5%, 52.00c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

Seamless Tubing: Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.05c.

Wire: Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.

Copper Wire: Bare, soft, fob eastern mills, carlots 26.92c, less carlots 27.42c; weatherproof, fob eastern mills, carlots 27.60c, less carlots 28.10c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles.
Pipe: Full coils 17.50c; cut coils 17.75c.
Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 5000 lb, 93.50c; less than 200 lb, 95.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb, 95.75c; less than 200 lb, 97.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., price on application.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.50c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb, 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)
Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A, B	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.00, No. 2 copper 17.00, light copper 16.00, composition red brass 13.50-13.75, auto radiators 10.50-10.75, heavy yellow brass 9.50, brass pipe 11.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.50-18.75, No. 2 copper 17.50-17.75, light copper, 16.25-16.75, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 14.00-15.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.50, No. 2 15.50, light copper 14.50, No. 1 composition red brass 12.00-12.50, No. 1 composition turnings 11.50, mixed brass turnings 8.00, new brass clippings nom. 12.00-12.50, No. 1 brass rod turnings 10.00-10.50, light brass 6.00-6.50, heavy yellow brass 8.00-8.25, new brass rod ends 10.00-10.50, auto radiators, unsweated 9.00-9.50, cocks and faucets 9.25-9.50, brass pipe 9.00-9.25.

Lead: Heavy 12.00, battery plates 6.50-6.75, linotype and stereotype 12.25-12.50, electrotype 10.75-11.00, mixed babbitt 10.75-11.00, solder joints 15.50-16.00.

Zinc: Old zinc 5.00, new die cast scrap 4.00-4.50, old die cast scrap 2.00-2.50.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S 8.50-9.00, old sheets 6.50-7.00, crankcases 6.00-6.50, borings and turnings 2.00-2.50, pistons, free of struts, 5.50-6.00.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50, castings 9.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$40.00
No. 2 Heavy Melt. Steel	40.00
No. 1 Busheling	40.00
Nos. 1, 2 and 3 Bundles	40.00
Machine Shop Turnings	35.50-36.00
Mixed Borings, Turnings	35.50-36.00
Short Shovel Turnings	36.50-37.00
Cast Iron Borings	36.00-36.50
Bar Crops and Plate	47.50-48.00
Low Phos. Steel	47.50-48.00
Elec. Furnace Bundles	46.50-47.00
Heavy Turnings	39.50-40.50

Cast Iron Grades

No. 1 Cupola	50.00-51.00
Charging Box Cast	43.00-44.00
Heavy Breakable Cast	39.00-40.00
Unstripped Motor Blocks	45.00-46.00
Malleable	59.00-60.00
Brake Shoes	39.00-40.00
Clean Auto Cast	50.50-51.50
R.R. Malleable	59.00-60.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.00
R.R. Malleable	59.00-60.00
Axles	49.00-50.00
Rails, Rerolling	52.00-53.00
Rails, Random Lengths	49.00-49.50
Rails, 3 ft and under	50.00-51.00
Rails, 18 in. and under	52.00-53.00
Railroad Specialties	51.00-52.00
Uncut Tires	49.00-50.00
Angles, Splice Bars	50.00-51.00

CLEVELAND

No. 1 Heavy Melt. Steel	$39.00-39.50*
No. 2 Heavy Melt. Steel	39.00-39.50*
No. 1 Busheling	39.00-39.50*
Nos. 1 & 2 Bundles	39.00-39.50*
Machine Shop Turnings	33.00-33.50
Mixed Borings, Turnings	33.00-35.00
Short Shovel Turnings	35.00-35.50
Cast Iron Borings	35.00-35.50
Bar Crops and Plate	43.00-44.00
Punchings & Plate Scrap	43.00-44.00
Heavy Turnings	38.00-38.50
Alloy Free Turnings	37.00-38.00
Cut Structurals	50.00-52.00

* Plus applicable freight springboard.

Cast Iron Grades

No. 1 Cupola	55.00-58.00
Charging Box Cast	50.00-52.00
Stove Plate	52.00-54.00
Heavy Breakable Cast	50.00
Unstripped Motor Blocks	50.00-51.00
Malleable	64.00-66.00
Brake Shoes	48.00
Clean Auto Cast	56.00-58.00
No. 1 Wheels	52.00
Burnt Cast	50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.00-41.00
R.R. Malleable	64.00-66.00
Rails, Rerolling	56.00
Rails, Random Lengths	53.00-54.00
Rails, 3 ft and under	57.00-60.00
Cast Steel	52.00-53.00
Railroad Specialties	52.00-53.00
Uncut Tires	50.00-51.00
Angles, Splice Bars	54.00-56.00

VALLEY

No. 1 Heavy Melt. Steel	39.50-40.00*
No. 2 Heavy Melt. Steel	39.50-40.00*
No. 1 Bundles	39.50-40.00*
Machine Shop Turnings	34.00-35.00
Short Shovel Turnings	36.00-36.50
Cast Iron Borings	35.50-36.00
Low Phos.	48.00-49.00

* Plus applicable freight springboard.

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.00-41.00

MANSFIELD

Machine Shop Turnings	36.50-37.50
Short Shovel Turnings	36.50-37.50

CINCINNATI

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
No. 1 Bundles	39.50
No. 2 Bundles	39.50
Machine Shop Turnings	33.50
Mixed Borings, Turnings	32.50
Short Shovel Turnings	35.50
Cast Iron Borings	34.50

Cast Iron Grades

No. 1 Cupola Cast	48.00
Charging Box Cast	40.00
Heavy Breakable Cast	42.00
Stove Plate	40.00
Unstripped Motor Blocks	39.00
Brake Shoes	36.00
Clean Auto Cast	47.00
Drop Broken Cast	50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	42.00
R.R. Malleable	58.00
Rails, Rerolling	48.50
Rails, Random Lengths	46.50
Rails, 18 in. and under	51.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.50-35.00
No. 1 Busheling	34.50-35.00
Nos. 1 & 2 Bundles	34.50-35.00
No. 3 Bundles	34.50-35.00
Machine Shop Turnings	28.50-29.00
Mixed Borings, Turnings	28.50-29.00
Short Shovel Turnings	29.50-30.00
Cast Iron Borings	29.50-30.00
Punchings & Plate Scrap	40.00-41.00

Cast Iron Grades

No. 1 Cupola Cast	45.00-46.00
Heavy Breakable Cast	38.00-39.00
Clean Auto Cast	45.00-46.00

BUFFALO

No. 1 Heavy Melt. Steel	$41.50-43.50
No. 2 Heavy Melt. Steel	39.25-40.25
No. 1 Busheling	39.25-40.25
No. 1 & 2 Bundles	39.25-40.25
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Cast Iron Borings	34.00-34.50
Short Shovel Turnings	36.00-36.50
Los Phos.	45.00-47.00
Elec. Furnace Bundles	44.00-45.00

Cast Iron Grades

No. 1 Cupola	48.00-50.00
Heavy Breakable Cast	43.00-44.00
Malleable	52.00-54.00
No. 1 Wheels	51.00-53.00
Stove Plate	47.00-49.00

Railroad Scrap

Rails, 3 ft. and under	50.00-52.00
Railroad Specialties	49.00-51.50

PHILADELPHIA

No. 1 Heavy Melt. Steel	$42.00-43.00
No. 2 Heavy Melt. Steel	42.00-43.00
No. 1 Busheling	42.00-43.00
No. 1, No. 2 Bundles	42.00-43.00
No. 3 Bundles	40.00-41.00
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Short Shovel Turnings	35.00-36.00
Bar Crop and Plate	47.50-48.50
Punchings & Plate Scrap	47.50-48.50
Cut Structurals	47.50-48.50
Elec. Furnace Bundles	44.50-45.50
Heavy Turnings	43.00-44.00
No. 1 Chemical Borings	39.00-40.00

Cast Iron Grades

No. 1 Cupola Cast	50.00-51.00
No. 1 Machinery Cast	52.00-54.00
Charging Box Cast	49.00-50.00
Heavy Breakable Cast	49.00-50.00
Unstripped Motor Blocks	46.00-47.00
Malleable	58.00-60.00
Clean Auto Cast	52.00-54.00
No. 1 Wheels	51.00-52.00

NEW YORK

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$38.00
No. 2 Heavy Melt. Steel	38.00
No. 1 Busheling	38.00
Nos. 1 & 2 Bundles	38.00
No. 3 Bundles	36.00
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	29.00-30.00
Short Shovel Turnings	30.00-31.00
Punchings & Plate Scrap	40.00
Cut Structurals	40.00
Elec. Furnace Bundles	40.00

Cast Iron Grades

No. 1 Cupola Cast	43.00-44.00
Charging Box Cast	43.00-44.00
Heavy Breakable	43.00-44.00
Unstripped Motor Blocks	40.00-42.00
Malleable	54.00-55.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.50-32.50
No. 2 Heavy Melt. Steel	31.50-32.50
No. 1 Bundles	31.50-32.50
No. 1 Busheling	31.50-32.50
Machine Shop Turnings	27.00-28.00
Mixed Borings, Turnings	28.00-29.00
Short Shovel Turnings	28.50-29.50
Bar Crops and Plate	32.50-33.50
Punchings & Plate Scrap	32.50-33.50
Chemical Borings	28.00-29.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-44.00
Charging Box Cast	38.00-39.00
Heavy Breakable Cast	38.00-39.00
Stove Plate	38.00-39.00
Unstripped Motor Blocks	36.00-37.00
Clean Auto Cast	40.00-42.00

CHICAGO

No. 1 Heavy Melt. Steel	$38.50-39.00
No. 2 Heavy Melt. Steel	38.50-39.00
Nos. 1 & 2 Bundles	38.50-39.00
No. 3 Bundles	36.50-37.00
Machine Shop Turnings	33.50-34.00
Mixed Borings, Turnings	33.50-34.00
Short Shovel Turnings	35.50-36.00
Cast Iron Borings	34.50-35.00
Bar Crops and Plate	41.00-41.50
Punchings	44.50-45.00
Elec. Furnace Bundles	39.50-40.00
Heavy Turnings	38.00-38.50
Cut Structurals	43.50-44.00

Cast Iron Grades

No. 1 Cupola Cast	48.00-50.00
Clean Auto Cast	48.00-50.00
No. 1 Wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	44.50-45.00
Malleable	64.00-65.00
Rails, Rerolling	56.00-57.00
Rails, Random Lengths	51.00-52.00
Rails, 3 ft and under	52.00-53.00
Rails, 18 in. and under	54.00-55.00
Railroad Specialties	52.00-53.00
Angles, Splice Bars	51.00-52.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$39.00-40.00
No. 2 Heavy Melt. Steel	37.00-38.00
Machine Shop Turnings	31.00-33.00
Short Shovel Turnings	33.00-34.00

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	45.00-47.00
Charging Box Cast	41.00-42.00
Heavy Breakable Cast	37.00-38.00
Brake Shoes	40.00-41.00
Clean Auto Cast	45.00-47.00
Burnt Cast	40.00-41.00

Railroad Scrap

R.R. Malleable	60.00-62.00
Rails, Rerolling	50.00-53.00
Rails, Random Lengths	45.00-47.00
Rails, 3 ft and under	48.00-50.00
Uncut Tires	43.50-44.50
Angles, Splice Bars	47.00-48.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$34.00-35.00
No. 2 Heavy Melt. Steel	34.00-35.00
No. 1 Busheling	34.00-35.00
Nos. 1 & 2 Bundles	34.00-35.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	41.00
Stove Plate	39.00
No. 1 Wheels	36.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.00
R.R. Malleable	42.50
Axles, Steel	39.00
Rails, Rerolling	41.00
Rails, Random Length	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars	41.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*25.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.50
Bar Crops and Plate	25.00
Cast Steel	25.00
Alloy Free Turnings	15.50
Cut Structurals	25.00
Tin Can Bundles	20.00

Railroad Scrap

No. 1 Heavy Melting	26.00
Axles	32.00
Rails, Random Lengths	26.50
Uncut Tires	33.50

*Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	24.00
Nos. 1 & 2 Bundles	22.00
No. 3 Bundles	22.00
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	24.50
Cut Structurals	24.50

Cast Iron Grades

No. 1 Cupola Cast	30.00
Charging Box Cast	25.00
Heavy Breakable Cast	24.00
Stove Plate	25.50
Unstripped Motor Blocks	24.00
Malleable	30.00
Brake Shoes	30.00
Clean Auto Cast	30.00
No. 1 Wheels	26.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	30.00
Rails, Random Lengths	21.50
Angles and Splice Bars	23.00

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	25.00
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melting	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	37.50-38.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

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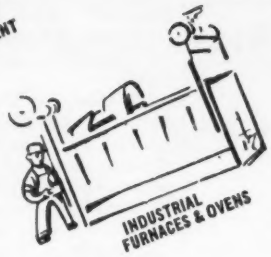

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Sheets, Strip . . .

Republic revises extras for hot and cold-rolled carbon steel strip

Sheet Prices, Page 154

Cleveland — Schedules of extras for hot and cold-rolled carbon steel strip have been revised by Republic Steel Corp. to bring them more in line with actual mill costs. Changes on hot-rolled concern pickling, extensometer tests, chemical requirements and packaging, while revisions on cold-rolled cover packaging and coil weights. Youngstown Sheet & Tube Co. also has issued revised schedules of extras for hot and cold-rolled strip, incorporating changes concerning pickling, oiling, extensometer tests, chemical requirements and packaging. One producer, operating on a monthly quota basis with respect to flat-rolled products, announced February quotas for its district offices last week. However, this producer has no quotas for coated products for the first three months of 1948, needing that amount of time to work off the backlog being carried over from 1947.

Boston — Narrow cold-rolled strip in lower-carbon grades is more difficult to obtain than higher-carbon grades and alloys, although spring steel and strip in the range of 0.50 to 0.80 carbon has tightened. Supply of hot strip is below requirements for cold-reduction operations and uncertain as to delivery. This indicates some revisions in first quarter cold mill schedules which are filled. Supply of all grades of sheets are below demand with the exception of stainless. Attempting to get cold-rolled steel, buyers are using pressure in placing order for other products, making supply of sheets contingent on placing orders for stainless tubing and other products in easier supply.

Philadelphia — Sheet producers generally estimate that they will go into the first quarter with arrearages about as heavy as ever. In fact, at least two mills claim their arrearages will be greater than those which marked the beginning of the current quarter. Electrical sheet quotas after the turn of the year will be a little larger, but they will be among the exceptions. Stainless steel sheets are in easy supply, with producers offering shipments at around six weeks on an average. Announcement of a drop of 1.25 cents a pound in nickel as of Jan. 1 has resulted in various inquiries from consumers as to the effect of this drop on stainless steel prices. Sellers reply that it is too early to say what, if any, action may be taken.

Pittsburgh — Sheet and strip supply for first half of next year is not expected to record significant improvement despite completion of cold-reduction facilities during the interim, while some trade authorities do not anticipate much relief until well into 1949. One of the major problems facing the steel industry is inadequate supply and comparatively poor quality of basic raw materials such as coke and scrap, thus restricting overall supply of ingots for conversion into many finished steel items. As noted frequently in the past, the continuous hot and cold-reduction

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mills have forced hand-mill operations to the "side-lines," with result there are very little hot-rolled sheets in the lighter gages produced. With the additional installation of cold-reduction mills it would appear logical that the hot-rolled sheet supply will be cut further. The overall shortage of sheet and strip indicated through 1948 has forced home appliance, automobile and other key consumer groups to realign projected production schedules for next year.

Cincinnati — As sheet mills push rolling equipment to feasible limits, it becomes apparent with approach of a new quarter that little, if any, inroads have been made in the volume of carryover. Mill interests pronounced that quotas during the past year have been conservative, in an effort to achieve a current basis for shipments, but the aim was not reached. Demand is terrific, with slight hope for larger allocations next quarter and even less chance for expanded deliveries.

St. Louis — Sheet production in this district dropped off last week following a breakdown in the slab mill at Granite City Steel Co. The suspension is expected to last about 10 days at a loss of around 10,000 tons. Operation of the company's new cold reduction mill was scheduled to begin Dec. 1. Starting rate will be slow and the first month's production small. An old reduction mill, which duplicates the new, has been sold to Ford Motor Co., Detroit, and is being dismantled. Company's 1948 order books are to open with beginning of the new operation. It expects to be current on orders by Jan. 1 after which production of hot sheets and plates will be stopped permanently.

Steel Bars . . .

Bar Prices, Page 154

Pittsburgh — Although demand-supply relationship in carbon bars is in better balance than other steel products, such as sheets, strip and plates, there is still a serious shortage, notably among the smaller sizes. First-quarter production allotments of merchant carbon bars have been slightly reduced reflecting a correction of previous over-optimistic mill estimates of ability to produce under present day operating conditions. In addition to retarding adverse effect on primary steel operating schedules due to poor quality raw materials, the steel industry is faced with necessity of relining overworked blast furnaces. Alloy bar producers note a continued moderate upturn in new orders particularly from agricultural implement manufacturers. With exception of alloy spring steel flats, most alloys are available within 4 to 6 weeks.

Hot-rolled alloy bar producers here have not yet followed Republic Steel Corp.'s price action Nov. 17 in revising alloy grade extras $2 to $3 per ton and size extras up to $20 a ton in smaller classifications. In line with the extra revisions on hot-rolled alloy, Republic Steel has made similar adjustments in the cold-finished alloy bar card. As in hot-rolled, no other cold-finishers yet have revised their extras. Continued improvement in new orders for cold-finished alloy and carbon bars is reported, although

some items in larger size ranges still are available from stock.

Boston — Most consumers of cold-finished bars have inventories in balance with demand and those of larger sizes in hot-rolled carbon show slight improvement. There are, however, tight spots in the latter, notably in small sizes. Bolt and nut producers lack rounded stocks and this contributes toward extended deliveries in fasteners. Many forge shops are working a higher ratio of alloys than formerly and that grade is in balance with demand. Automatic screw machine products make up a substantial volume of bar buying.

Philadelphia — Some producers of hot carbon bars expect to have order books in better balance by the end of this year, although sellers without exception will have a carryover of unfilled, past-due tonnage. Actually, there will be a few large sellers who will be in no better position than heretofore and probably in a little worse position, especially on small and medium sizes.

A large eastern producer is expected to announce shortly new analyses extras, also new size extras which in the case of blooms, billets and slabs will effect only certain sizes.

Cleveland — Republic Steel Corp. has made upward revisions in its cold-finished alloy bar extra schedule, affecting size and alloy content of rounds, hexagons and squares. These changes, effective Nov. 17, accompany similar revisions in extras on hot-rolled alloy bars and alloy blooms, billets and slabs. The revisions reflect recent increases in prices of ferroalloys.

Tubular Goods . . .

Tubular Goods Prices, Page 155

Pittsburgh — Sellers continue under heavy pressure for delivery of all pipe and tubing classifications, with exception of stainless and alloy mechanical pressure tubing, and to lesser extent for API drill pipe. Pressure for shipments of standard pipe and bulk of oil country goods is not expected to ease for months. The Marshall Plan should not involve much pipe for western European countries. Indicative of the industry's efforts to modernize and expand production facilities to meet huge pent-up demand for pipe is recent report that Wheeling Steel Co. has awarded a contract to Aetna-Standard Engineering Co., Youngstown, O., for a continuous butt-weld tube mill at its Benwood Works. Upon completion of the program, the Benwood plant is expected to have a monthly capacity of 20,000 net tons of butt-weld pipe, or about 1/3 over present capacity; and production of lap-weld pipe at the plant will be discontinued. Rust Furnace Co. has been awarded a contract for a car-type annealing furnace, for heat treatment of fabricated pipe, by F. Shaw Co., Wilmington, Del.

Boston—Merchant steel pipe allocations for the first quarter are generally unchanged with some mills tentatively lining up about 30 per cent of district quotas, for direct shipments. Included in the latter category are utilities with prospective tonnage substantially under requirements which are estimated at five to six times heavier than prewar.

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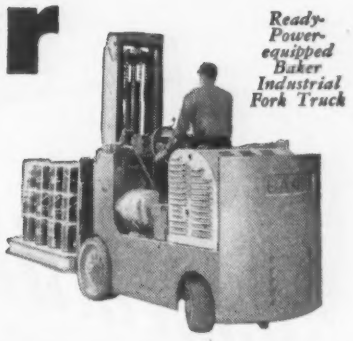

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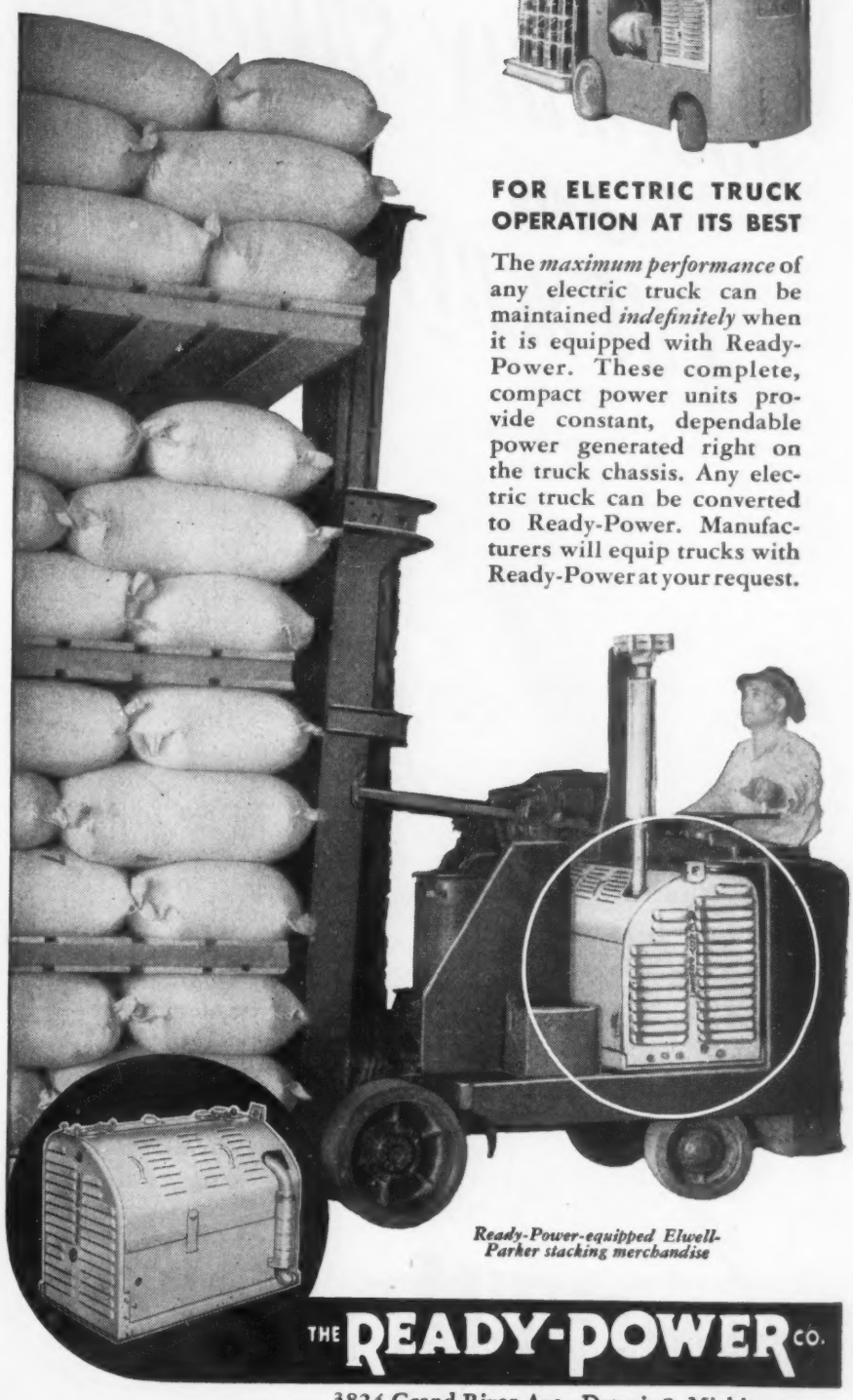

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Structural Shapes . . .

Structural Shape Prices, Page 155

New York — Structural steel market is fairly active here with a number of district schools up for figuring and with two fairly sizable schools in Queens having been awarded recently. In addition, plans are expected out shortly for the superstructure for the Van Wyck highway project in Queens for the state of New York.

Boston—New inquiry for fabricated structural steel is light. Bids for the construction of two piers, Mystic river bridge, closes Dec. 8, taking 650 tons of steel piling. Superstructure of this bridge will take 35,000 tons of structural steel. Fabricating shops have fair backlogs with unbalanced inventory of plain material to meet commitments. There appears to be slight chance for improvement in plain material tonnage in the near future with freight car building drawing off a substantial volume.

Philadelphia — A leading shape seller indicates that he will enter the new year with order books in better balance than in many months. This is ascribed primarily to conservative action in the acceptance of new orders and to the actual blocking out of certain periods over recent months.

Plates . . .

Plate Prices, Page 155

Boston — Fabricators are shopping for tonnage more infrequently than formerly, realizing no additional volume is available. Tank shops are improvising where possible and for small units, floor plate, high-tensile alloy and aluminum are utilized. Some producers will not sell these grades for this application. Mills taking orders for light carbon welding quality plates are heavily loaded, while order backlogs with other mills carry a relatively high ratio of special quality. Weldment shops' inventories are lower than was the case some weeks back. Weldment tonnage is far in excess of the prewar average.

Philadelphia — Plate producers are making slow progress in bringing their order books into balance. Notwithstanding conservative action in the acceptance of new orders, most sellers will have fairly substantial arrearages at the end of this year, a fact they ascribe in part to the inability to get operations up to normal because of shortage of metallics. Certain district plants are unable to operate their rolling departments more than four days a week or, not infrequently, more than three days. Pressure for new tonnage continues as strong as ever, especially for light gage plate.

Tin Plate . . .

Tin Plate Prices, Page 155

Washington — An order stopping use of tin plate containers for beer, coffee and other nonfood products was drafted tentatively last week at a conference of 14 steel company representatives called by H. B. McCoy, Office of Materials Distribution. Order will be discussed with representatives of the brewing and other interested industries and probably will go into effect at the beginning of 1948.

Scrap . . .

Brokers' buying prices ease slightly. Relatively little new reported

Scrap Prices, Page 160

New York—Brokers' buying prices last week eased off $1 to around $38 for the principal steelmaking grades, with some leading scrap brokers anticipating a further drop of several dollars a ton. This forecast is predicated on new mill buying which is expected to develop at substantially lower prices. Meanwhile, shipments are moving almost entirely against back orders, with most commitments now about completed. Short shovel turnings are off slightly to $30 to $31, fob shipping point. Cast grades are exceptionally tight, but brokers are holding their buying prices unchanged.

Boston — With old higher priced contracts virtually completed, price for heavy melting steel scrap is now on a basis of $40, Pittsburgh delivered, or $31.50 to $32.50, fob shipping point here, with moderate new buying down at that level. Other steelmaking grades are adjusting to that plane with usual differentials. Supply of strictly No. 1 is limited, although accumulations in yards have mounted during recent period of inactivity. About the only increase in tonnage emanates from heavier shipbreaking at tide water points. Cast has not gone through the drastic price fluctuations and most large consumers have built up reserves.

Pittsburgh — Mills have formally canceled unshipped tonnage on higher priced orders, most of which expired around Nov. 22. Relatively little new buying is reported at the $40 level for heavy melting steel, with leading brokers and dealers unwilling to make large tonnage commitments as long as future price trends remain so uncertain. Scrap inventories in recent weeks reflect heavy shipments on higher priced orders. Further tightening in pig iron supply has accentuated the shortage in cast scrap and resulted in forcing price for No. 1 cupola up another $1 to a range of $50 to $51. Higher prices also have developed for railroad items, with railroad malleable on Pennsylvania Railroad's recent list allocated at close to $60.

One important aspect of Pittsburgh Steel Co.'s purchase of the government blast furnace at Monessen, Pa., is that the company will require some 16,000 tons less scrap per month when the furnace is placed in operation toward the close of second quarter next year. In addition, operation of this unit will make possible sale of 18,000 to 20,000 tons of pig iron each month to foundries and other interests.

Philadelphia — The end of the present test period in steel scrap is believed to be near at hand. Traders are hesitant to predict precisely what the outcome will be, but meanwhile prices are unchanged. Steel producers are pressing hard for cast scrap of most of any of the major grades in an effort to compensate somewhat for their inability to get sufficient pig iron.

Cleveland—Bulk of the scrap mov-

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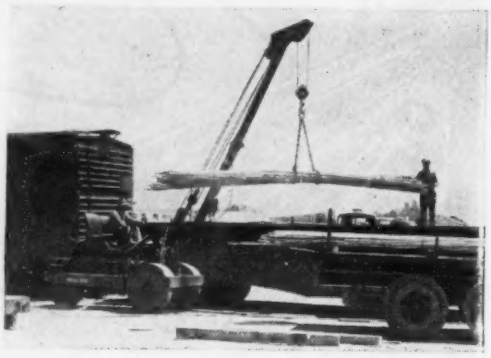

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ing to mills is material earmarked for shipment from steel consumers to their steel suppliers. Although most old high-priced orders for dealer scrap expired Nov. 22, the $44.50 orders of one consumer in the Valley remained in effect until Dec. 1, and while dealers were seeking enough scrap to cover the latter there was little inclination to seek new business immediately from consumers, the bulk of whom have displayed resistance to prices above $39.50, Cleveland, for No. 1 heavy melting steel. Very little dealer scrap is expected to move in December, one reason being brokers are hesitant to take $39.50 orders when they fear they will have to cover at a loss, and another reason being the custom of dealers to stay out of the market in December for tax consideration. It is expected this custom will prevail again this year. However, one scrap consumer is increasingly hopeful that the resistance displayed the last month against high scrap prices, along with increases in receipts of earmarked scrap from steel consumers, will be stabilizing factors when scrap consumers again attempt to buy dealer scrap. With steel mills receiving an increasing quantity of scrap from their steel customers, foundries are finding it more difficult to obtain scrap, with the result they are having to pay increasingly higher prices. Entering into the additional cost are freight charges that result from the necessity of taking remote material in order to get enough scrap to continue foundry operations.

Detroit — Deadline of Nov. 22 brought cancellations of all high-priced orders for scrap from mills which apparently for the moment are sufficiently comfortable on inventories to make a determined stand to hold the current price level. The earlier relaxation from the so-called "formula" price enticed a fairly good supply of material to the market, persuading mills to adopt a waiting policy in the expectation that after the turn of the year tonnage will be forthcoming at present prices.

Chicago — Transactions in the scrap market here aggregated a small volume last week, but there seemed to be a growing recognition of the $39, delivered, price which steel mills have been offering for the past several weeks for heavy melting steel. Industrial producers of scrap are selling their output in keeping with this basis and brokers also are acquiring some dealer materials. Railroads continue to get higher prices for their offerings, but there are indications that a slight easing may be getting under way. Market sources seem cheered by evidence of price stabilization, but point out that the real market test will not come until early December.

Buffalo—Further strength in cast items featured the scrap market last week as the stalemate continued in steelmaking grades. Cupola cast jumped $2 a ton to a range of $48 to $50 on fresh sales. Stove plate prices mounted similarly to a range of $47 to $49. Dealers and leading mill consumers remained deadlocked on ingot items as mills refused to go above $39.25 in bidding for No. 2 heavy melting and bundles. There were additional indications of the stalemate being prolonged as some dealers showed a preference to remain out of the market until Jan. 1.

Pig Iron . . .

Pig Iron Prices, Page 156

Pittsburgh — Critical shortage of pig iron supply for the foundry trade is becoming more acute due to necessity of relining long over-worked blast furnaces and fact current output of a number of units is below rated capacity because of poor quality coke and high price levels for turnings. It is reported some blast furnace interests are considering revising downward their rated capacity data to more realistic levels to reflect the poor quality fuel situation. The lone merchant stack here, for example, is unable to produce at better than 90 per cent of capacity because of inadequate fuel supply, while it is estimated that nearly 20 per cent of rated pig iron capacity on country-wide basis is being lost for reasons outlined above.

Less than 60 per cent of merchant pig iron requirements for this district currently is available to the trade. A number of gray iron foundries here were forced to close down recently while lone merchant stack was producing malleable iron, and it is expected some malleable shops will have to do likewise while the stack is on foundry iron for next few weeks.

Foundries anticipate some improvement in pig iron supply by middle of next year, now that Pittsburgh Steel Co. has been awarded the 1200-ton government owned Monessen, Pa., blast furnace, which was 95 per cent completed before construction was halted toward the close of the war. It is hoped this unit will make available about 20,000 tons of additional pig iron monthly to the foundry trade and other interests. With the sale of this unit all blast furnaces in the western Pennsylvania area will have been brought into the industry's all-out production effort to offset present critical iron shortage.

Philadelphia — Foundries, handicapped by shortage of pig iron and scrap, closed down the day before Thanksgiving for the remainder of the week. Arrangements, however, were made to take in whatever shipments of pig iron and scrap that might arrive. The month just closed will show a generally lighter melt at district foundries than in October, because of stringency in raw materials. Only in metallurgical coke have foundries been able to maintain a fairly comfortable position in recent weeks, and this by virtue of the fact that the larger of the two blast furnaces at Swedeland, Pa., has been down for repairs and, consequently, has made its normal consumption of coke available to other consumers. This furnace should be in blast again by not later than Dec. 15, which will help the pig iron situation. Most foundries have enough metallurgical coke on hand to keep them going until March.

Cleveland — Shortage of merchant pig iron is expected to become even more intensified as a result of the sale by the War Assets Administration to Pittsburgh Steel Co. of one of two turboblowers from the government-owned Cleveland blast furnace operated by Republic Steel Corp. The turboblower is to be moved from Cleveland and installed at Monessen, Pa., at a government-owned incomplete blast furnace which has been

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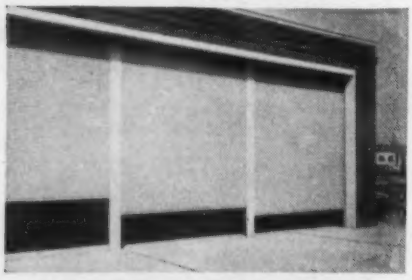

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sold to Pittsburgh Steel Co. This will leave the Cleveland furnace dependent on one turboblower, which is said to be insufficient for high efficiency operations. Furthermore, breakdown of the lone turboblower would put the Cleveland furnace out of production, inasmuch as its location does not permit serving it with turboblowers of Republic's other blast furnaces. Shutdown of one of American Steel & Wire Co.'s blast furnaces here for repair has temporarily pinched the stringent supply of merchant iron. Any interruption to the flow of iron to foundries presents a critical problem inasmuch as those consumers are operating on a hand-to-mouth basis, one large foundry, for example, reporting it has only a week's supply of pig. Consumers of merchant iron dependent on Tonawanda Iron Corp.'s production at North Tonawanda, N. Y., have been inquiring at Cleveland for new sources of pig after that subsidiary of American Radiator & Standard Sanitary Corp. withdraws from the merchant iron trade Jan. 1.

Boston—Dwindling delivery of pig iron from the Buffalo and other outside furnaces is marked by the suspension of shipments of merchant iron tonnage by an upper New York unit. This integrated producer will melt all its production. Main supply for New England melters is the 15,000 tons monthly from Everett, Mass.

Washington — Contract for rebuilding the Gadsden blast furnace has been let to Arthur G. McKee & Co., Cleveland, by the War Assets Administration. Furnace is expected to be ready for operation in February or March. Republic Steel Corp., with an interim lease on the stack, will put it on foundry grades, producing at the rate of 280,000 tons annually for cast iron pipe and for other southern foundry uses.

Youngstown, O. — New No. 4 blast furnace at the Carnegie-Illinois Steel Corp.'s Ohio Works was lighted Nov. 20, with a large delegation of high officials attending, including Benjamin F. Fairless, president, U. S. Steel Corp., and Charles R. Cox, president of Carnegie-Illinois.

The new furnace is a 900-ton unit, and was built on the site of old No. 4 furnace, a 750-ton unit which was originally built in 1904.

The new furnace has some unusual features. One is the carbon block construction of the hearth which boosted cost $30,000 to $40,000. Blast furnace men said it will virtually eliminate the danger of breakouts, and that it likely will give a longer furnace life and probably greater yield. Another feature was abrasion resisting steel plate construction in the downcomers instead of brick construction, eliminating danger of brickwork falling out of place.

Buffalo — The pinch in pig iron supplies has become more acute with additional reports of foundries paring operations. Although 15 out of 16 stacks in the area are active, producers report shipments are far short of meeting even the so-called urgent demands made by consumers to avoid shutdowns or sharp curtailments in output.

Cincinnati—Although pig iron allotments are unchanged, shipments into this district are lagging to the extent that some interests fear quotas will not be fulfilled.

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HOTEL CLEVELAND

Cleveland, Ohio

Rails, Cars . . .

Track Material Prices, Page 155

New York — New freight cars placed in service totaled 7736 during October, but 12,129 cars were retired from operation at the same time, the Association of American Railroads reported last week. Installations for the first 10 months this year totaled 46,308 cars, but 60,486 were retired. As a result, orders on hand with builders Nov. 1 called for 109,467 new cars. This was the highest since April, 1923.

Steel Interests Buy Carter Coal Co.

Carter Coal Co., holding mines capable of shipping 1,500,000 tons annually, has been purchased by a group of Cleveland, Youngstown and Canadian steel and coal interests and preparations are being made to resume production at the mines, idle since the Navy returned them to the company last June.

Frank Purnell, president of Youngstown Sheet & Tube Co., Youngstown, will be board chairman of the purchasing company. Leigh Willard, president of Interlake Iron Corp., Cleveland, will be president, and H. G. Hilton, president of the Steel Co. of Canada, Hamilton, Ont., and Henri Pell Junod, Pickands, Mather & Co., Cleveland, will be vice presidents.

Pickands, Mather & Co. will supervise the company's sales.

Carter Coal owns mines in West Virginia with capacity for 1,500,000 tons. Mines produce Pocahontas coal which has been used by the purchasing steel companies and others for many years. Idleness of the mines during the past summer has contributed to the shortage of coking coal which has adversely affected pig iron and steel production.

1948 Seen Repetition of 1947 in Steel Production

(*Continued from Page* 63)

ceive this year, he said, pointing out that Republic, third largest steel producer, will produce almost exactly 2 million tons of sheets and strip this year, and 2 million tons is more flat rolled steel than is produced by Weirton Steel Co., Bethlehem Steel Corp. or Jones & Laughlin Steel Corp. It is obvious, he said, that no such tonnage could be lifted out of established distribution channels without causing a complete breakdown of industrial production.

Users Acquire Mills — "As you know," he said, "the nonintegrated hand mills which produce sheets have practically all been acquired by large steel users, such as General Electric and Borg-Warner, who are beyond suspicion. Four of them, however, have been bought by so-called syndicates whose antecedents are pretty obscure. They undoubtedly find themselves with surplus sheets beyond

Cuts under water

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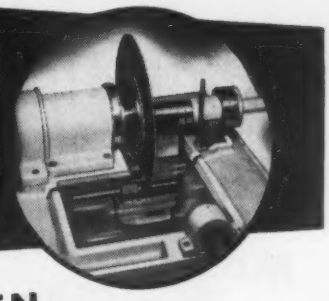

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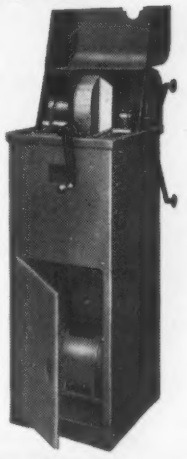

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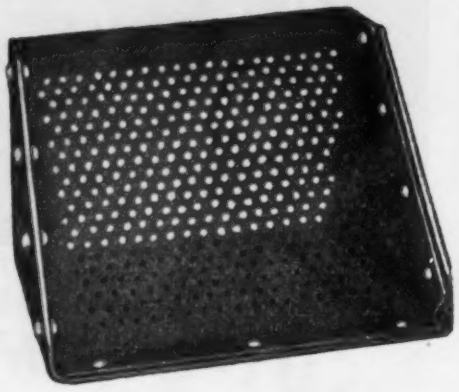

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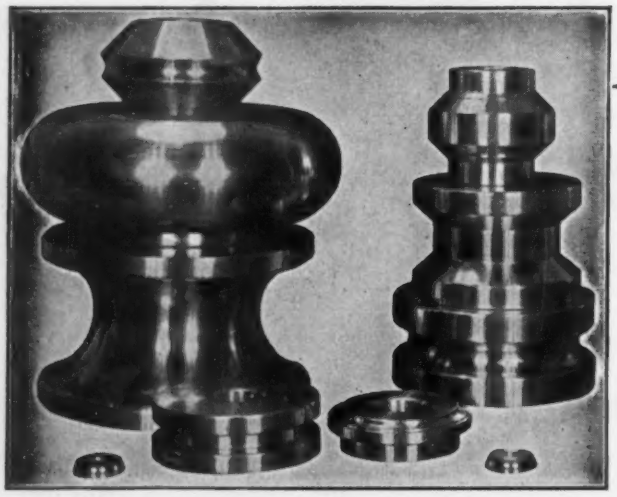

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the needs of their own syndicate members. However, even if this surplus was sold at black market prices, and I don't know that it is, the total capacity of these four units is only 300,000 tons, of which only a minor portion in turn reaches the open market."

Details Charges — Following Mr. White on the platform as speaker, Tom L. Smith, president of the institute, detailed at length the various charges and abuses in distribution levelled at the steel industry. He cited the Washington investigations and the testimony given at the various hearings and gave eight reasons why stampers have not been able to obtain adequate sheet and strip steel to meet the demand for stampings. These are: 1—Diversion of sheet steel to the "gray market;" 2—unequal allocations by steel mills between owned stamping companies and independent stampers; 3—shortage of scrap; 4—refusal of certain steel producers to ship direct to small users; 5—refusal of certain steel producers to accept orders for hot rolled steel as in the past; 6—refusal of certain steel mills to accept and fill orders from old customers located at considerable distance from mills; 7—refusal of certain steel mills to recognize historical position of stampers with companies absorbed by steel mills; 8—lack of sufficient ingot and rolling mill, pickling and hot-roll capacity.

As a result, Mr. Smith said, stampers have been forced to purchase steel in the "gray" market, engage in ingot conversion deals and use inferior quality steel. As a result, cost of stampings has been increased because of greater down-time of presses, more frequent and increased cost of tool settings, greater quantity of spoiled work, and the disproportionate time of management required to find enough steel to keep operating.

Makes Recommendations—He concluded his talk with 11 recommendations to correct existing conditions: 1—That the steel mills recognize the seriousness of the "gray" market and take steps to correct such diversion of tonnage; 2—that the steel companies carry out informal agreements with government authorities as a condition for removal of government control of steel distribution on a basis of prewar history of purchases; 3—that steel company-owned stamping companies be treated the same as independent stampers in the allocation of steel; 4—that steel companies recognize the historical position of stampers with steel producers now absorbed by them; 5—that steel producers resume shipments of

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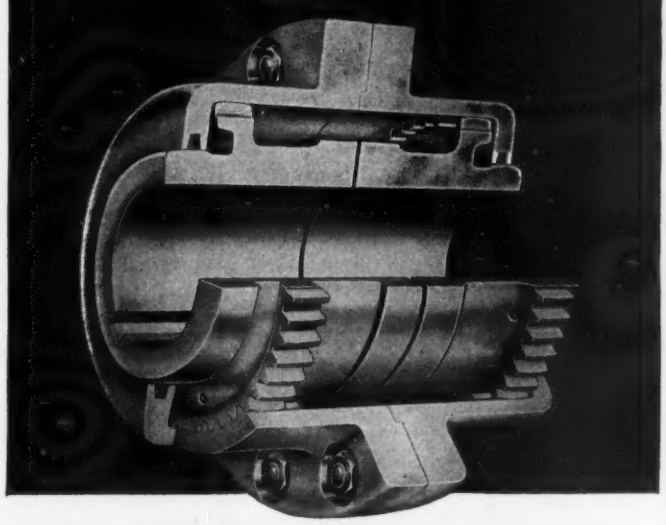

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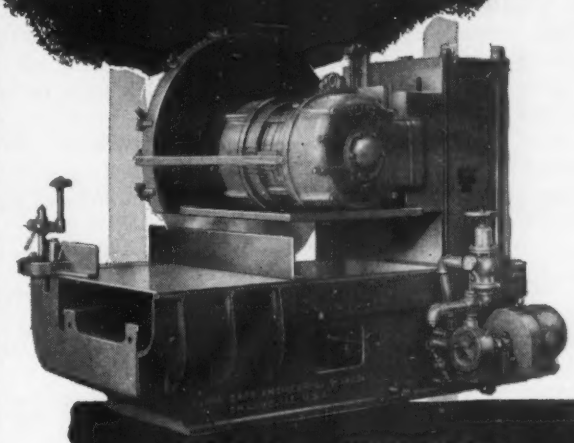
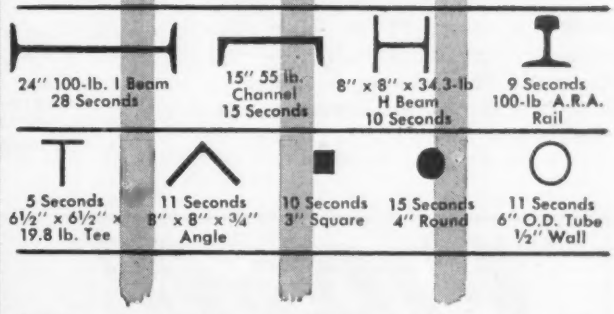
Modern Sawing



with KLING HIGH SPEED FRICTION SAWS



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hot-rolled steel to those stampers having a historical position as to its use; 6—that allocation of steel based on historical position be made regardless of geographic locations of customers; 7—that steel mills fill orders from stampers who have a historical position with the company, regardless of size; 8—that the government greatly accelerate at this time the sale of surplus ships, obsolete war material and all other property that is now or will eventually be sold as scrap; 9—that the government speed the collection and preparation of scrap now abroad; 10—that the scrap, ingot and semi-raw steel requirements under the Marshall Plan be carefully screened giving due consideration to possible disturbance to the domestic market; 11—that the steel companies give due consideration to the present and probable future per capita requirements for sheet and strip and provide necessary ingot, hot and cold rolling capacity to meet such demands.

The meeting was closed with an address by Jerry Doyle, labor relations director, Research Institute of America. This was supplemented by showing of a documentary film "Crossroads for America" aimed as an antidote for leftish propaganda.

Program for the meeting was arranged by J. A. MacMillan, executive vice president and treasurer, Geometric Stamping Co., Cleveland, in his capacity as program chairman. Hunter Morrison Jr., vice president, Morrison Products Inc., Cleveland, chairman of the institute's Cleveland District, served as chairman of the meeting, which, in addition to the stampers, was attended by many steel warehousemen and industrial purchasing agents.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

880 tons, school No. 20, Queens, New York city, to Harris Structural Steel Co., that city.

850 tons, school No. 173, Queens, New York city, to Harris Structural Steel Co., that city.

350 tons, reconstruction, Pier 88, Seattle, to Pacific Car & Foundry Co., Seattle; Atherton Construction Co., Seattle, general contractors.

220 tons, plant addition, Lucas Paint Co., Gibbsboro, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

650 tons, steel piling, two piers, Mystic river bridge, Boston; bids Dec. 8.

470 tons, steel gates, Medicine Creek dam, Missouri Basin project, chief engineer, Bureau of Reclamation, Denver.

350 tons of column cores, for Minskoff apartment, Fifth Ave., New York; bids asked; substantial tonnage of reinforcing trusses required.

175 tons, Woolworth store, Huntington, Long Island; bids asked.

Unstated tonnage, school, North Belmore, Long Island.

Unstated tonnage, auditorium, Blair Academy, Blairstown, N. J.; pending.

Unstated, fishways near Hells Gate, Fraser river, B. C.; bids to International Pacific Salmon Fisheries Commission, New Westminster, B. C., Dec. 15.

Unstated, warehouse, Canyon Ferry Camp; bids to Bureau of Reclamation, Helena, Mont., Dec. 18.

REINFORCING BARS . . .

REINFORCING BARS PLACED

115 tons, state bridge, Klickitat county, Washington, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

525 tons, east and west Calumet floodgates, U. S. engineer, New Orleans; bids Dec. 19, work also requires 150 tons, structural steel gates, and 21,200 square feet, steel sheet piling.

500 tons or more, men's ward, Steilacoom state hospital, Washington state; Macdonald Building Co., Tacoma, low, $2,644,142.

200 tons, Washington state highway bridges; general contracts to Hamilton Builders, Olympia, $69,958, and Fiorito Bros., Seattle, $439,025.

200 tons, Mystic river bridge, Boston; bids Dec. 8.

100 tons, tunnel and canal, Riverton project, Wyo., chief engineer, Bureau of Reclamation, Denver; work also takes 100 tons, steel tunnel supports.

Unstated, $250,000 warehouse and service building for General Electric Co., Portland, Oreg.; bids asked.

PLATES . . .

PLATES PLACED

100 tons plus, 1535 feet 66-inch steel water pipe for Seattle, to American Pipe & Construction Co., Portland, Oreg., low $38,969.

PLATES PENDING

900 tons, three 30-foot diameter surge tanks, Central Valley project, Calif., chief engineer, Bureau of Reclamation, Denver.

Unstated tonnage, 150,000-gallon storage tank, Hungry Horse project, Mont., chief engineer, Bureau of Reclamation, Denver.

PIPE . . .

CAST IRON PIPE PENDING

890 tons, including 755 tons, 14-inch, and 135 tons, 12-inch, steel pipe, Boulder Canyon project, chief engineer, Bureau of Reclamation, Denver; work also includes 400 tons, steel plates, for storage tanks.

100 tons plus, 6 and 8-inch pipe, hydrants and steel water tank for Beverly Park Public Utility Department, Everett, Wash.; bids Nov. 28.

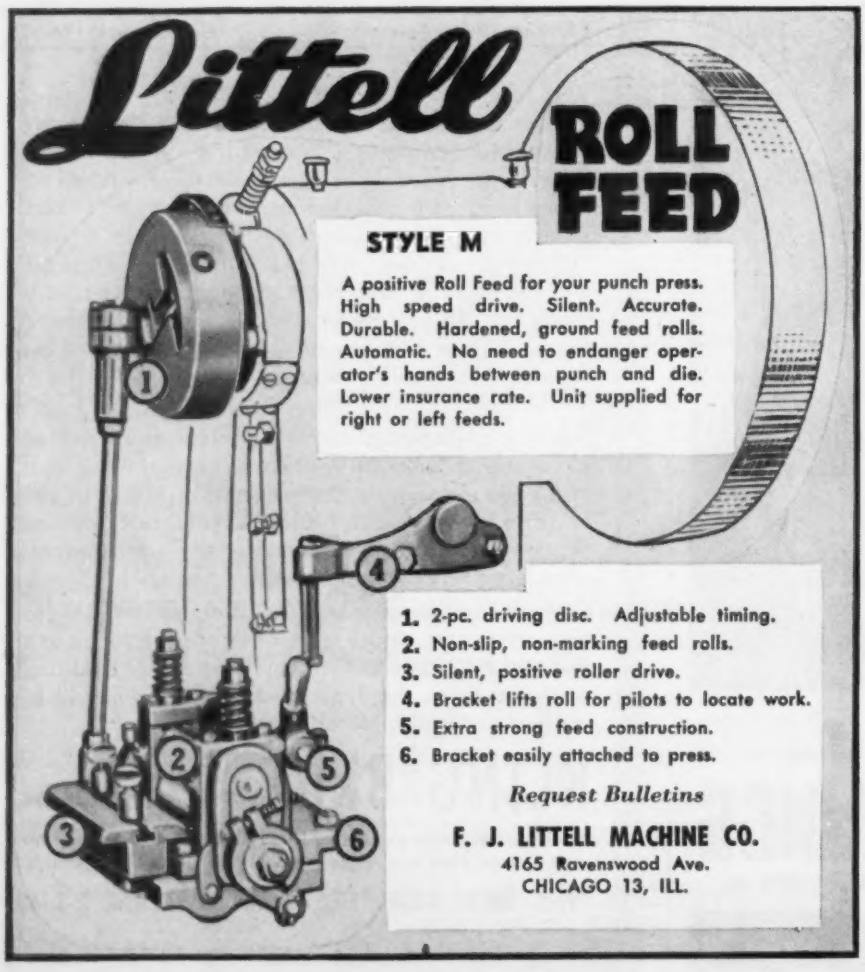
RAILS, CARS . . .

LOCOMOTIVES PLACED

Baltimore & Ohio, 100 diesel-electric, 1000 horsepower, switching engines; 40 to Electro-Motive Division, General Motors Corp., La Grange, Ill.; 25 to Baldwin Locomotive Works, Eddystone, Pa.; 25 to American Locomotive Co., New York; and 10 to Fairbanks, Morse & Co., Chicago.

Denver, Rio Grande & Western, four 1000-horsepower and three 1500-horsepower diesel-electric switching engines, to Fairbanks, Morse & Co., Chicago.

Indian State Railways, 150 broad-gage 2-8-2 type steam locomotives, 90 going to Montreal Locomotive Works, Montreal, Canada, and 60 to the Canadian Locomotive Co.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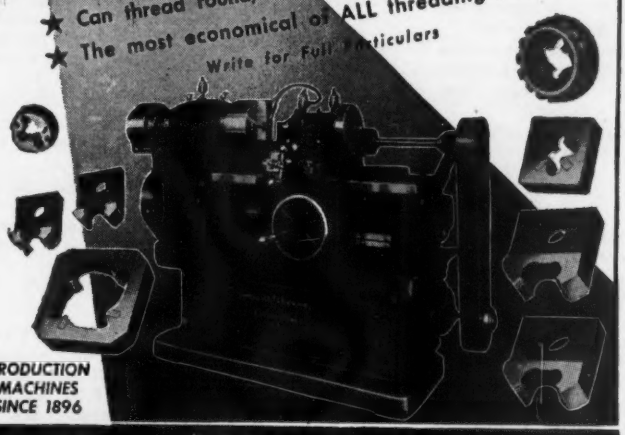

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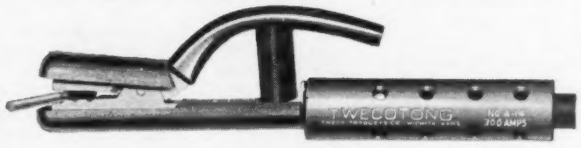

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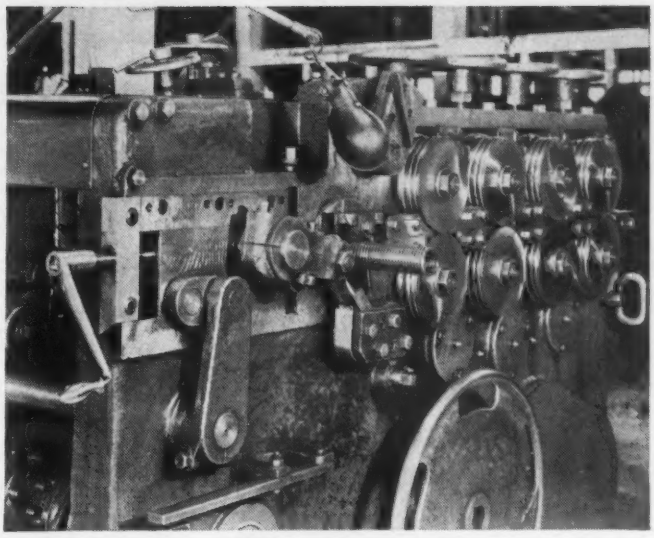

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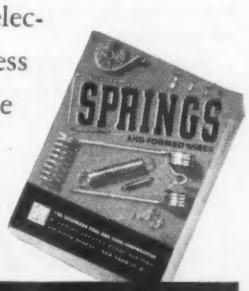

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CONSTRUCTION AND ENTERPRISE

CALIFORNIA

CRESTA, CALIF.—Pacific Gas & Electric Co., 245 Market St., San Francisco, has awarded a $21,500,000 contract to T. E. Connolly Inc., 461 Market St., San Francisco, for construction of a surge tank, tunnel and related structures for a hydroelectric plant near here.

LOS ANGELES—Eastern Smelting & Refining Co. has been incorporated with a capital of $150,000 by Joseph V. Broffman and associates. Firm is represented by Balter & Balter, 639 S. Spring St.

LOS ANGELES—Century Steel Corp. has been formed with a capital of $500,000 by Lewis B. Kean and associates. Firm is represented by H. E. Higginson, 817 Van Nuys Bldg.

LOS ANGELES—Longview Fibre Co., 4814 Loma Vista Ave., has awarded a $500,000 contract to W. P. Neil Co., 4814 Loma Vista Ave., for construction of a factory.

OAKLAND, CALIF. — National Iron Works, 3438 Louis St., will build a $100,000 fabricating plant.

PALO ALTO, CALIF.—United Heliocopters Inc., Stanley Hiller Jr., president, 625 El Camino Real, has awarded a $300,000 contract to Remmet Construction Co., 131 University Ave., for erection of a 2-story plant.

SALINAS, CALIF.—Salinas Metal Crate Co. has been incorporated with a capital of $1 million by Calvin Davis and associates. Firm is represented by John A. Foley, 1224 Hearst Bldg., San Francisco.

SAN DIEGO, CALIF.—San Diego County Water Authority has awarded a $358,699 contract to Pipe & Construction Co., Los Angeles, for erection of the west section of the San Diego Aqueduct's Oceanside-Fallbrook extension.

SAN FRANCISCO—Western Pipe & Steel Co., subsidiary of Consolidated Steel Corp., has received a steel pipe contract totaling about $6 million for the East Bay Municipal District, Oakland.

SAN LEANDRO, CALIF.—Pacific Can Co., 290 Division St., San Francisco, has awarded a $225,000 contract to Cahill Construction Co., 206 Sansome St., San Francisco, for erection of a plant.

FLORIDA

BARTOW, FLA. — Armour Fertilizer Works has let a $500,000 contract to Rust Engineering Co., Birmingham, for construction of a phosphate plant.

ILLINOIS

CHICAGO—Elmer E. Mills Corp., 153 W. Huron St., has awarded a contract to Robins Construction Co., 1009 N. Wells St., for erection of a $125,000 plant.

CHICAGO—Supreme Products Inc., 320 E. 21st St., has awarded a contract to Ragnar Benson Inc., 4744 Rice St., for construction of a $300,000 factory.

CREVE COEUR, ILL. — Linde Air Products Co., New York, unit of Union Carbide & Carbon Corp., has started construction of an oxygen filling station and acetylene producing plant here.

EAST ST. LOUIS, ILL.—Aluminum Ore Co., 3300 Missouri Ave., D. H. Tilton, works manager, will build a $750,000 plant for the manufacture of fluoride chemicals.

MICHIGAN

ANN ARBOR, MICH.—Acme Broach Co., 510 Ann Arbor Trust Bldg., has been formed by Francis J. LaPointe with a capital of $500,000 to manufacture and sell tools, dies, jigs and machinery.

DETROIT — Detroit Engineering & Machine Co., 411 S. Fort St., has been formed by Joseph C. Kalman with a capital of $200,000.

DETROIT—Dale Corp., 9114 E. Forest, has been formed by Dale Alderman with a capital of $150,000 to manufacture and sell gages, tools, dies and machinery.

DETROIT—Distel Tool & Machine Co., 2585 Beaufait, has been formed by Richard Distel with a capital of $100,000 to manufacture and sell tools, dies, fixtures and jigs.

DETROIT—Reproduction Products Co., 12790 Westwood, has been formed by Roy N. Leemon with a capital of $200,000 to manufacture and sell blue print materials and equipment.

DETROIT—Morris Farm Machinery Co., 8427 Harper, has been formed by Fred B. Fitch with a capital of $100,000 to manufacture and sell farm machinery.

FLINT, MICH.—Century Products Co., 1109 E. Stewart, has been formed with a capital of $100,000 by J. A. Coletti to manufacture and sell machine tools, parts, dies, chucks and fixtures.

HOLT, MICH.—Holt Products Co., Walnut St., has been formed by Ernest E. Hunt with a capital of $185,000 to manufacture and sell metal products.

SAGINAW, MICH. — Wickes Corp., 515 N. Washington, has been formed by Harvey R. Wickes with capital of $10 million to manufacture and sell machinery, tools and implements.

MISSISSIPPI

LIBERTY, MISS.—Interstate Oil Pipeline Co., P. O. Box 1394, Tulsa, Okla., has awarded contracts totaling $195,000 to Refinery Maintenance Co., P. O. Box 1349, Tulsa, for construction of pumping stations at Lake St. John and Cranfield near here.

NEW JERSEY

NEWARK, N. J.—Federated Metals Smelting & Refining Co., 150 St. Charles St., has awarded a contract to Wallace J. Wilck, State St., Perth Amboy, for construction of a $250,000 project including a factory, warehouse and small heating plant.

NEW YORK

BROOKLYN, N. Y.—E. A. Laboratories Inc., 696 Myrtle Ave., plans to build a 5-story, $350,000 factory at 130 Spencer St. Plans are by Andrew V. Bekay, 323 Elmwood Ave.

BUFFALO—Hewitt-Robins Inc., Kensington Ave., will build a $600,000 plant addition.

FALCONER, N. Y.—Lindell-Eckberg Mfg. Co. Division of Croft Steel Products Inc., Market St., will build a $225,000 plant. Engineers and architects are Kohl & Simon, 1841 Broadway, N. Y.

NIAGARA FALLS, N. Y. — International Paper Co. will build a steam boiler plant costing $1,250,000.

TONAWANDA, N. Y.—Martin Fireproofing Co., Beachridge, will build a $150,000 plant.

TONAWANDA, N. Y.—Syracuse Supply Co., 314 W. Fayette St., Syracuse, will build a $150,000 plant.

NORTH CAROLINA

CHARLOTTE, N. C.—Salem Spring Co. has been incorporated by Arthur A. Beam at 2215 Berryhill Rd. with a capital of $100,000 to manufacture and rebuild springs.

GREENSBORO, N. C.—Southern Oxygen Co., Washington, will soon start construction of a $75,000 oxygen and acetylene manufacturing plant. A second plant will be built in the future.

VIRGINIA

LYNCHBURG, VA.—Philadelphia Gear Works has deferred construction of a branch plant until some time in 1948. Consulting engineers are Wiley & Wilson, Peoples Bank Bldg.

BEDFORD, VA.—Virginia Rubatex Division of Great American Industries has a $150,000 expansion program under way for an office building and plant. New equipment will be installed costing an additional $500,000.

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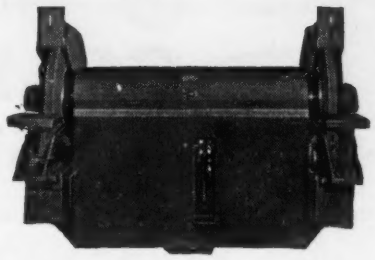

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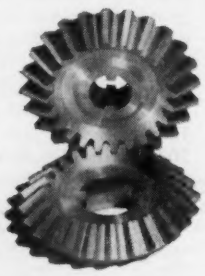

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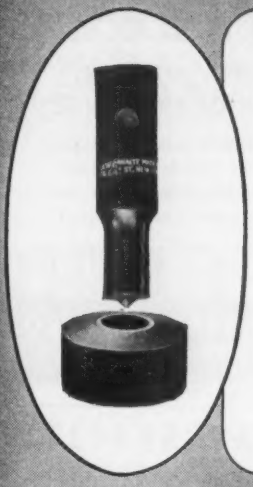

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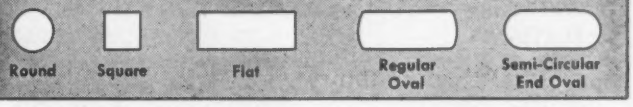

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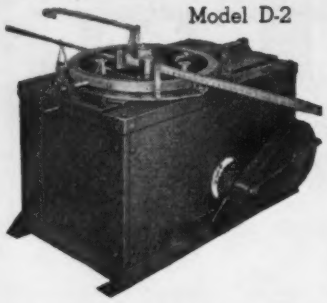

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YOUR REPRESENTATION...

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Help Wanted

Wanted

ROLLING MILL SUPERVISOR

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Help Wanted

WANTED

Designer and Experimental Manager Established Farm Machinery Factory

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NEW 10-STAND FORMING & WELDING MILL FOR CONTINUOUS BUTTWELD PIPE

more and better pipe at less cost—

Out with the old . . . in with the new.

Aetna-Standard announces another improvement in the manufacture of pipe in the continuous butt weld process. A new 10-stand forming and welding mill in place of the conventional 6-stand mill.

The 10-stand mill produces three distinct production and cost advantages:

1. **Much greater output.** Production will be as much as 50% greater on some sizes of pipe than with mills now in use. The reason—use of wider skelp, greater reduction and elongation.
2. **Higher furnace efficiency.** Use of wider skelp for the small sizes of pipe utilizes furnace capacity to better advantage. Speed through furnace need not be increased to increase production.
3. **Better quality.** It has been proven that the more work done in reducing increases quality of weld.

As in all fields, industry looks to the leader for new ideas and new developments. In continuous butt weld pipe and seamless tube, Aetna-Standard has built more mills than all other companies combined.

The first installation of the new Aetna-Standard 10-stand continuous butt weld pipe mill is nearing completion. If you want more information on design, production, costs or other phases of this type of pipe mill, let us hear from you.

THE MAINTENANCE CREW CAN CHEER, TOO

1. Better guards to shield mill and adjacent parts from scale and water.
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4. All gears enclosed in oil-tight casings.
5. Roll spindle bearings lubricated from centralized grease system.
6. Drives lubricated from centralized oil system.
7. Individual motor drives (more flexibility in setting ratio of reduction, and longer roll life.)

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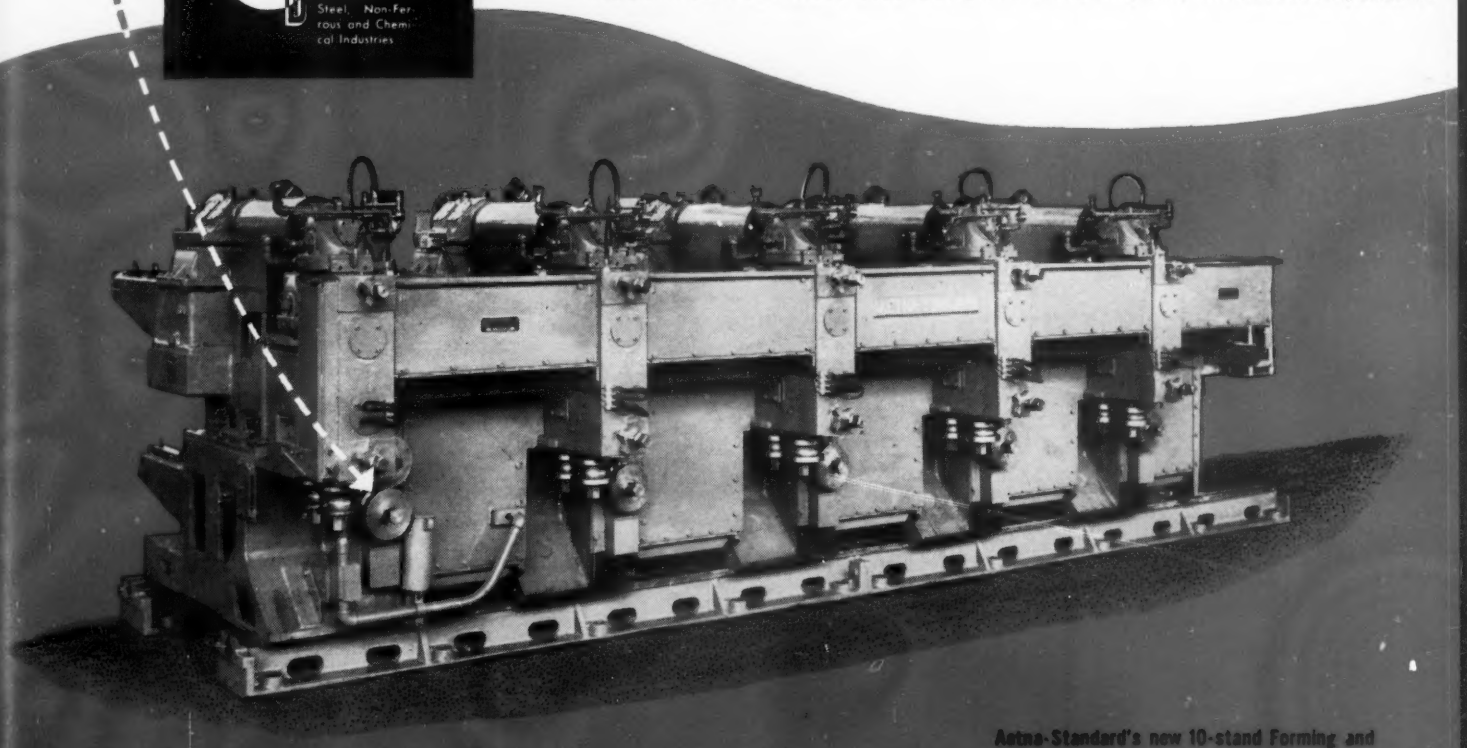
THE AETNA-STANDARD ENGINEERING COMPANY
YOUNGSTOWN, OHIO

ASSOCIATED COMPANY: HEAD WRIGHTSON & COMPANY, LTD., MIDDLESBROUGH, ENGLAND



Aetna-Standard's new 10-stand Forming and Welding Mill for Continuous Butt Weld Pipe

The WEAN ENGINEERING Company, Inc.

WARREN, OHIO

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CONTINUOUS STRIP PICKLING

MULTIPLE STRIP SLITTING

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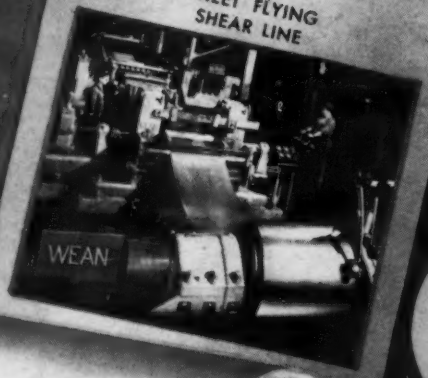

To better serve the requirements of the trade and to operate at a profit in a highly competitive field, steel plant executives recognize they must have the most modern and efficient equipment available.

The Wean Engineering Company, Inc., Warren, Ohio, is the recognized leader in the design and installation of sheet, tin and strip mill equipment, whether it be one piece or a complete unit.

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SPECIALISTS IN SHEET STRIP AND TIN MILL EQUIPMENT